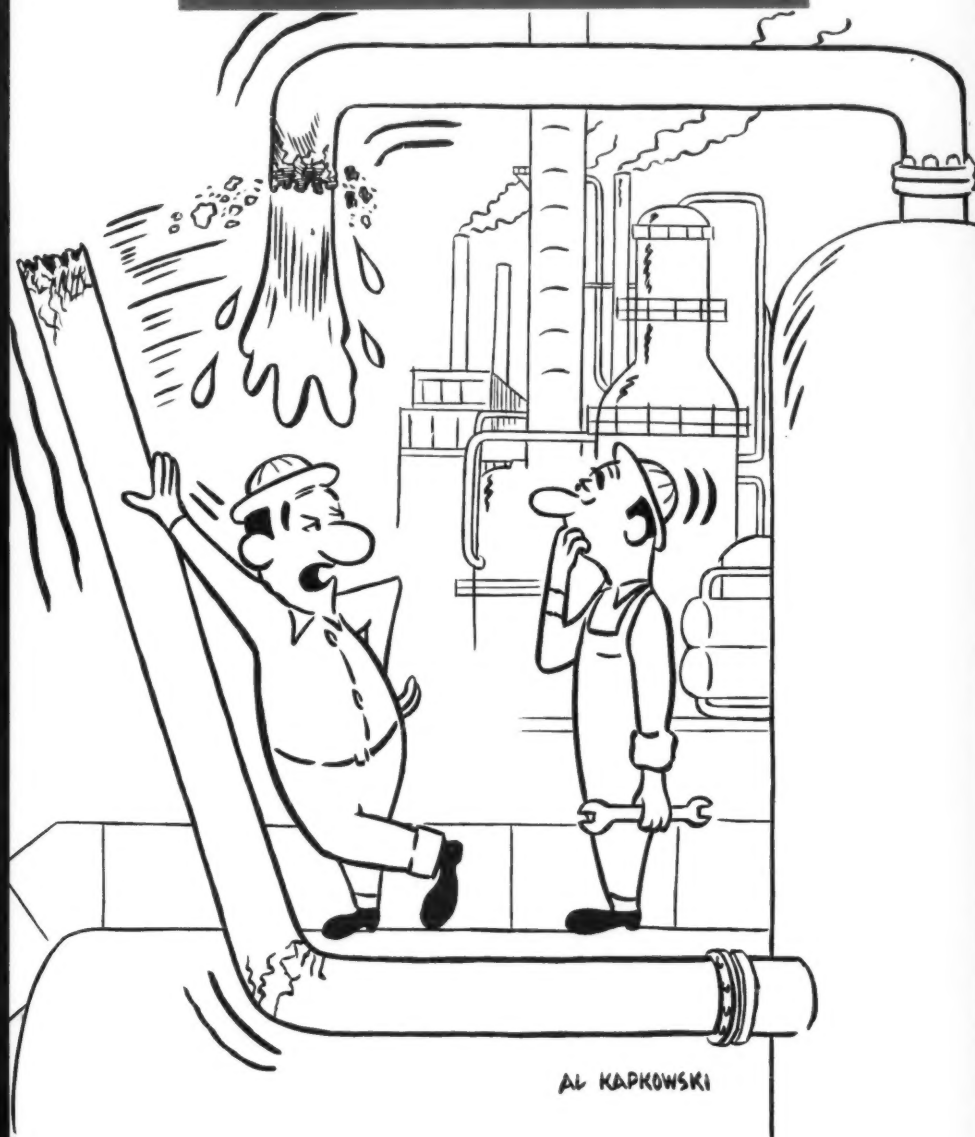


For Men Who Manage

JULY 1956

chemical processing



AL KAPKOWSKI

I dunno, Rusty. I don't think we have any corrosion probl

Jesting aside...

corrosion is a serious problem

in our industry

FOR ANSWERS

to your

CORROSION PROBLEMS

see spotlight section starting on page 51

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Why is this magazine so "different"?
THE EDITORS EXPLAIN — PAGE 118

PUTMAN PUBLICATION

Industry Magazines for Industry

If You Buy Acids or Other Chemicals



in Tank Car Loads...

You Need this Valuable Information On Tank Car Unloading

Here's valuable, time-saving information on unloading various types of tank cars . . . available free from General Chemical's technical library. If you buy any of the chemicals listed in tank car quantities, these information-packed bulletins are a "must" for you.

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Chemicals covered: Electrolyte, Hydrofluoric Acid (Aqueous), Mixed Acid or Nitrolic Acid, Oleum, Spent Acid, Sulfuric Acid, and Fluosulfonic Acid

"Unloading Rubber-Lined Tank Cars"

Chemicals covered: Liquid Alum, Aluminum Chloride, Muriatic Acid, and Phosphoric Acid

"Unloading 'Non-Regulatory' Liquid Chemicals from Tank Cars"

Chemicals covered: Aqueous Ammonia, Lime Sulfur Solution, Sodium Silicate Solution, and Sodium Sulfide, Liquid

"Unloading Nitric Acid from Tank Cars"

"Unloading Anhydrous Hydrofluoric Acid from Tank Cars"

"Unloading Sulfan* (Stabilized Sulfuric Anhydride) from Tank Cars"

HERE'S HOW YOU CAN GET THESE TANK CAR UNLOADING BULLETINS

Just fill in and mail the coupon at right, checking the information you're interested in receiving. Bulletins desired will be sent promptly and without any obligation.

*Reg. U.S. Pat. Off.



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**THAT'S
INTERESTING**



A water tank gets personality. With a demure look fresh from the paint bucket, it peers down from atop the Putman Publishing Co. building. (Picture and caption are from the Chicago Tribune Sunday Magazine)

Seen this face before? . . . maybe in your own newspaper?

The friendly countenance, gazing down on Chicago's Michigan Ave., is the result of a little imagination when the Putman water tower needed painting about six months ago. It has smiled from the pages of newspapers throughout the country.

Putmanites, interested in having the once-ordinary tank keep its individuality, have been holding an informal contest to turn up ideas for other eye-catchers for when painting time rolls around again. Fresh ideas are certainly not restricted to Putman employees, however . . . we welcome suggestions.

How about one from you, Mr. Reader?

Even evaporation loss is big in Texas

Old Sol is causing some people in Texas a few headaches. SCPCEWR (Southwest Cooperative Project on Control of Evaporation of Water from Reservoirs) is considering now a means to alter the fact that Texas is losing almost as much water from reservoir evaporation annually as it uses—about seven million acre-feet lost by evaporation, eight million acre-feet used.

A possible solution is based on tests run in Australia for the past several years. In these tests a thin (one ten-millionth of an inch) chemical coating is spread on the water surface of the reservoir. The thin film coating is non-injurious to aquatic life and has no effect on use of water for municipal, industrial, or agricultural purposes. Engineers have estimated that water could be saved by this method at a cost of less than \$0.80 per acre-foot. (See page 115, this issue.)

(Please turn to page 211)

When inquiring check 6329 opposite last page

chemical processing

(CHEMICAL PROCESSING PREVIEW)

for men who manage

Vol. 19

July 1956

No. 7

Serving more than 45,000 circulation in these industries:

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... made by specialists
in corrosion-resistant metals



cost
no more
than
ordinary
fittings

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Improving the Standard of Living

This photograph of Jim Wilding, (right) Supt. of the Westvaco plant at Lawrence, Kansas, discussing an editorial story with me during a recent visit to the plant, points out what we editors are trying to do. (One of the stories developed that day appears on page 70, this issue.)

As CP editors, our job is to visit companies throughout the country, talk to key men such as Mr. Wilding, and learn how plants are finding better, more economical methods of processing. Photographs are taken, then articles are written and presented in such a manner that they can be quickly understood by key men in other plants, who can then take advantage of these ideas.

Hence, we see our job as one of communication, transmitting ideas to processing men in plants across the nation on how time, labor, and materials have been saved or product quality improved in other plants.

It has been said that few housewives found out about the labor-saving advantages of the sewing machine until 10 to 20 years after it was invented. Our job is to help to overcome this communications lag. In this way we hope that we are doing our small part to help plants operate more efficiently, and thereby improve the standard of living for everyone.

Gordon Weyermuller

Associate Editor

- For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page
- The product directory, pages 202 to 205, is your guide to all articles and advertisements

- To subscribe to this magazine, see reader-qualification form opp. last page

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THIS MONTH'S COVER

CP-reader Al Kapkowski of Esso's Bayway Refinery gets credit for the cartoon on this month's cover. While humorous, the drawing does point to an attitude we've noted in many plants: corrosion problems are too often not recognized and controlled early enough to prevent costly repair and replacement. Latest techniques and products for protection against corrosive attack are described in the spotlighted Corrosion Control section . . . starts on page 51.

CHEMICAL BUSINESS —

A new service in CHEMICAL PROCESSING

On page 19 of this issue you'll find something new in CHEMICAL PROCESSING. It's a rundown of significant happenings and trends in our industry. And it has been specially prepared to take an absolute minimum of your reading time.

CHEMICAL BUSINESS has been published separately by Putman Publishing for some time. Its circulation has been to a restricted list. The increasing tempo of chemical developments in predominantly business areas has made it apparent that technical people as well as business people must keep abreast of what's happening. And this means increasing your reading load.

To make this increase as painless as possible we've collected and correlated news from our sources and we've pared verbage to the bone in presenting it to you. We think you'll find CHEMICAL BUSINESS fast, easy, and rewarding reading.

JOHN C. VAALER
Editor

now FOR DC OR RESISTANCE INPUT

MODEL 200-A uses an input of 10,000 ohm resistance potentiometers as an input transducer providing 10 to 1 scale expansion and origin positioning. Available standard digital input accessories are essentially inputs of this type. Any resistance potentiometer will provide an analog input for this configuration.

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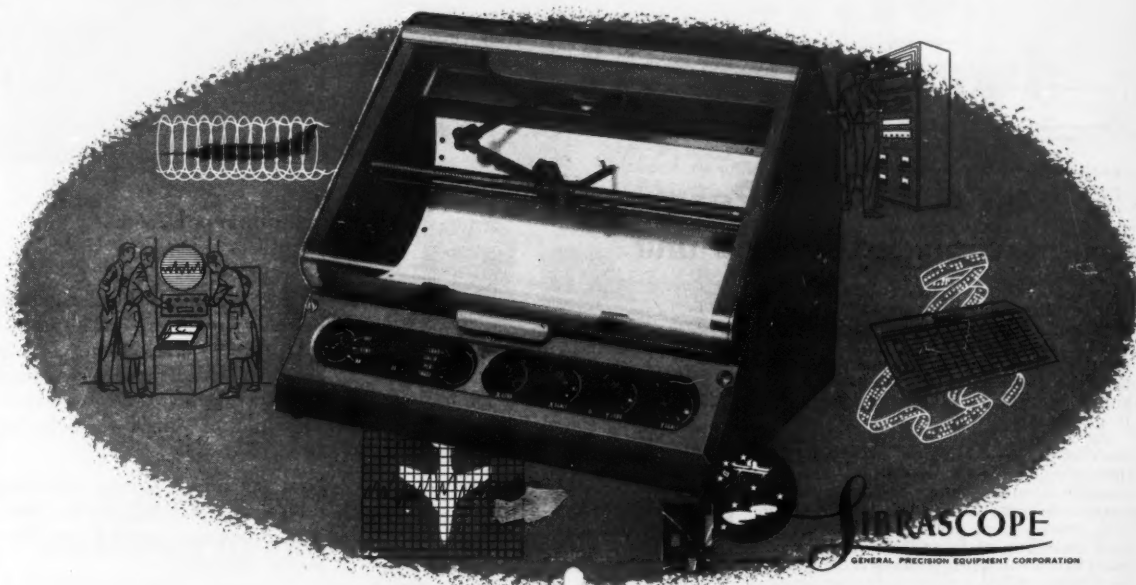
now FOR SIMPLIFIED OPERATION

Precision Vernier Dials provide an accurate method for obtaining fine adjustment during operation. Optional point plot or continuous line plotting is a feature of both models. Selection is by front panel manual control. A new, simplified pen of one-piece design—used for point or continuous plotting—eliminates bottles and tubes, permits rapid changing of ink colors. Independent action of the X and Y axis is achieved with Librascope's unique "Floating Gear Train." No cables, tapes or lead screws to cause lost motion, cable stretching or drifting out of alignment. The 120° concave cylindrical plotting surface provides full visibility... is completely illuminated.

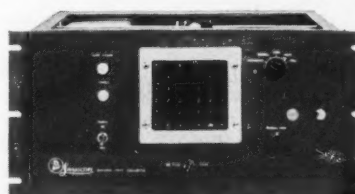
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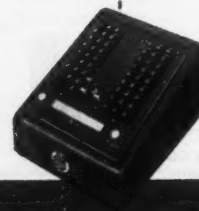
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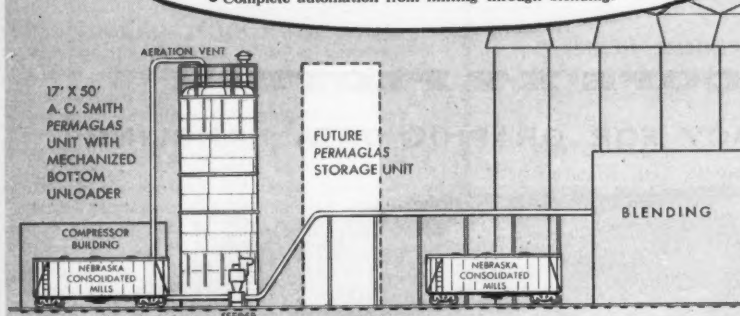
(Convention and Exhibit Schedule is on page 201)

Here's more mechanized bulk materials handling NEWS

Processor solves expansion problem...stores more in less space at lower cost...

ALABAMA FLOUR MILLS* — Bulk Flour Handling System with A. O. Smith Permugas Mechanized Storage Unit

- Eliminates bags, cuts manpower hours and handling costs.
- Glass-protected inside and out minimizes contamination and infestation, eliminates usual costs for exterior maintenance.
- Reduces bulk materials inventory and housekeeping costs.
- Complete automation from milling through blending.



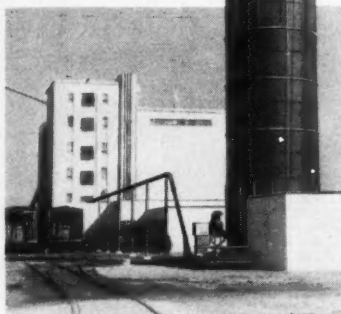
*Division of Nebraska Consolidated Mills Co.

with A. O. Smith Permugas[®] mechanized storage unit

ALABAMA FLOUR MILLS' plant in Decatur, Ala. needed more storage space for flour . . . used in blending of different grades. Because of space limitations inside the plant, they found it more economical to install a 17' x 50' Permugas Mechanized Storage unit "outside", as shown in photo at right.

As a result, this customer eliminated the cost of expensive housing because condensation, due to temperature variations outside, need not be a problem with Permugas Storage units. And with mechanical, sweep-arm, bottom unloading the bulk handling of flour from airslide railroad cars to blending process is completely automatic. What's more, future expansion plans present no space problem with out-door storage, utilizing Permugas units.

Today, hundreds of Permugas Mechanized Storage units provide low-cost, bulk materials storage and handling for feeds, sugars, grains, wood products, chemical compounds and many others.



BULK FLOUR — 17' diameter, 50' high Permugas Mechanized Storage Unit, glass-protected inside and out, is used for storing bulk flour.

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HARVESTORE DIVISION
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Muncy, Pennsylvania

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looking ahead

to next month...



Handling polyesters in bulk?

Increasing trend toward handling various polyester resins in tank-truck quantities has caused a number of questions to be asked more and more: What kind of tank materials are best and *least expensive* . . . what kind of pumps . . . what precautions are necessary?

Next month's Material Handling section brings you up to date on the latest methods and equipment needed for this money-saving operation.

"What's New" in diisocyanates

Diisocyanates . . . showing up in everything from auto tires that will outlast the car to soft foams and extremely tenacious adhesives . . . are produced in National Aniline's new multi-million dollar plant in Moundsville, W. Va. Next month's Materials section brings you up to date on these compounds which are finding more and more uses. Latest data on the basic diisocyanates, as well as formulations for polyurethane foams and coatings will be presented . . . along with a discussion of present and projected applications.

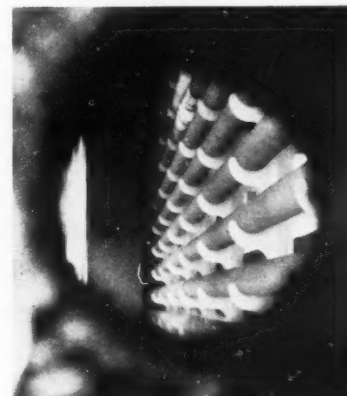
CaC₂ at 3700° . . . on conveyors

Neatest trick of the month . . . National Carbide, down at Calvert City, Ky., is producing CaC₂ in a continuous operation. Material is produced in four new Norwegian furnaces. Problem . . . continuous handling of the product.

CaC₂ is formed at 4000°F at furnace's electrode, is tapped at 3700°F.

Cast steel "chiller" conveyor was the answer. Although calcium carbide is 'way over steel's melting point, a cooled "crust" is formed when material hits the air, forming an insulation and protecting the conveyor. Conveyor's carry gives material about 20 minutes for cooling . . . then it can be handled with no further problems . . . if we can consider sealed, continually air-purged vibrator conveying no problem.

You'll find out how it works in next month's New Solutions section.



Interior of furnace—at 1750°F

Another wartime substitute finds permanent usage

Nickel-chrome-iron alloy . . . developed as a material substitute during the Korean fracas . . . has been found to be equal to or better than previous alloys used in the field of ethylene manufacture. Furnaces using the material have operated successfully

Here's a quick preview
of features you'll find
in August **CHEMICAL PROCESSING**

at Gulf Oil Corp., Port Arthur, Texas, since installation in 1951 . . . alloy resists carburization at temperatures of 1750°F.

One of next month's New Solutions stories tells you how the alloy works for Gulf and how it can help solve some of your equipment problems.



Ultrasonics for emulsions

Making various two- and three-component emulsions in pilot plant quantities, Hart Products Co., of Jersey City, was particularly concerned with stability and long shelflife. They get both now through use of a portable, ultrasonic mill.

Assistant Editor Bill Clarke visited with Chief Chemist E. J. Steiner and brings you the story in the August New Solutions section.

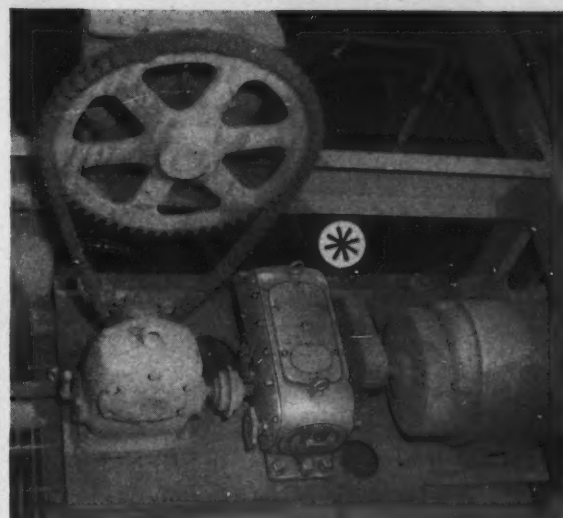
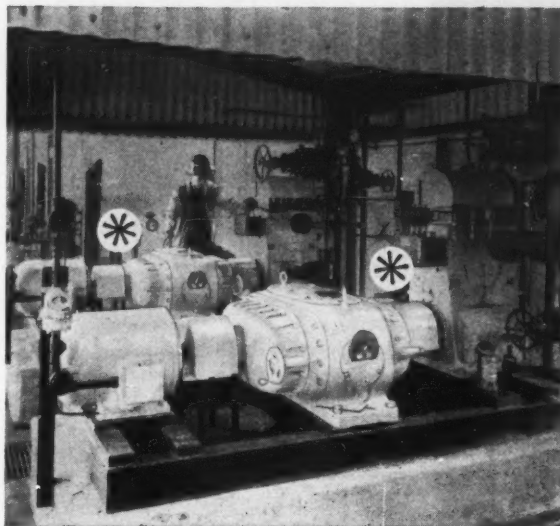
Handling time for bleach reduced by 90%

Thomas Phillips Co., Akron (Ohio) manufacturer of sacks and multiwalls, uses 15 percent sodium hypochlorite for paper pulp bleaching. Previously two men spent from one-half to one hour tediously measuring and adding this bleach by hand. Now, with a stationary measuring tank and corrosion-resistant piping, one man does the job in ten minutes . . . a time saving of up to 90 percent.

Assistant Editor Frank McElroy made a trip to Akron, talked to J. B. Pickering, Phillips' Mill Superintendent, and brings you the story in next month's Engineering section.

Carbon black...

By means of a hand wheel on this Link-Belt P.I.V. Variable Speed Drive, speed of the driven screw conveyor can be changed at will to feed carbon black into pelletizing conveyor at optimum rate.



...to carbonyl

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IT'S P.I.V. for exact regulation at an infinite number of variable speeds

*Delivers required hp from
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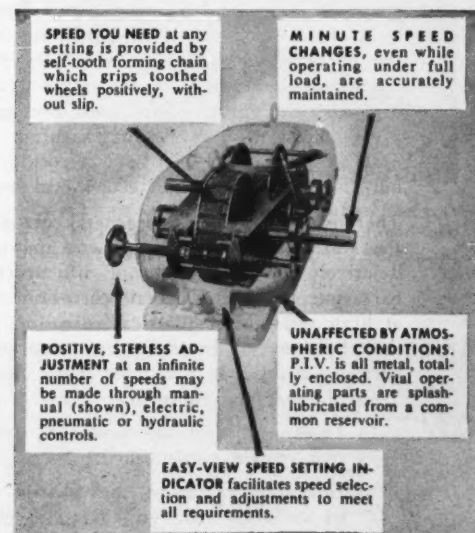
There's no dependence on friction here. Instead, self-tooth-forming chain meshes with

grooved wheels, delivering required speeds constantly, dependably.

Versatile P.I.V. drives are made in 8 sizes, 16 types, from ½ to 25 hp. Let your nearest Link-Belt office or authorized stock-carrying distributor know your needs or send for 88-page Data Book 2274.



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F. L. LaQUE
"Doctor of Deterioration and Corrosion"

One of the honors that has been accorded to F. L. LaQue, whose name is immediately recognized as that of an outstanding authority of corrosion control, is Doctor of Deterioration and Corrosion at International Nickel's Seahorse Institute. He is a past president of the National Association of Corrosion Engineers and a recipient of the F. N. Speller Award in Corrosion Engineering, among other honors. He engages in a variety of activities with technical societies in corrosion control work.

Mr. LaQue has been associated with The International Nickel Company since he received his degree in Chemical and Metallurgical Engineering from Queen's University, Kingston, Canada, in 1927. He is now Vice President and Manager of the company's Development and Research Division.

MANAGEMENT and CORROSION PROBLEMS

F. L. LaQUE

This publication is designed for management in the chemical industry. This management has a more than academic interest in corrosion. Their interest goes beyond casual attention to the means for combating corrosion that are offered and described in technical articles and advertising pages. It goes beyond the kind of an answer that is given by the check marks or symbols that are used in tables published in some journals that are supposed to tell which materials resist which environments. It is the kind of interest that demands the kind of answer secured only when the nature of the corrosion problem has been described precisely and the abilities of the means available to deal with the problem have been assessed equally precisely. In this way, management is able not only to secure an answer to a corrosion problem, but also to find the most economical one.

There is no such thing as a general corrosion problem and no such thing as a general answer to one. Relatively few cases occur of difficulties or embarrassments due to overall corrosion of metals at high rates. Most practical corrosion problems are characterized by difficulties associated with forms of attack that leave most of the metal intact. These include the following:

- 1) Penetrating pits surrounded by large areas that remain unblemished.
- 2) Intergranular fissures that convert the body of an alloy into an aggregate of loosely

bonded crystals otherwise undamaged, but which can neither carry load nor resist penetration by the liquid they are supposed to contain.

- 3) Removal of an alloy constituent so as to leave a weak residue that occupies the original volume but is able to carry only a frac-

tion of the original load.

- 4) Development of cracks only where the metal has been stressed and has suffered little or no other attack.
- 5) Perforation of a tube or pipe only in regions of peculiarly high turbulence, leaving the rest of the tube or pipe relatively unaffected.



F. L. LaQue (second from left, front) inspecting some test specimens with some visitors at International Nickel's corrosion testing station at Kure Beach, North Carolina

- 6) Intolerable contamination of a product by a minute amount of metal taken into solution by corrosion so slight that the metal itself remains substantially unharmed.
- 7) Localized attack that occurs at some flaw, scratch or weak spot in an otherwise intact protective coating.
- 8) Failure of a coating to provide protection, not because it won't resist the environment, but because it will not adhere to the metal to which it is applied.

Prediction of when such insidious forms of corrosion may be expected, recommendation of steps to be taken to avoid them, and diagnosis of the nature of the difficulty and how to overcome it require the attention of specialists.

A fair number of such specialists are on the staffs of the firms interested in supplying corrosion-resisting materials, protective coatings and other means of controlling corrosion. There aren't enough of them on the staffs of companies who have the corrosion problems — including many in the chemical and process industries where the economical solution of these problems frequently represents the difference between success or failure of a new process or new product.

User specialists are needed to help describe the problems in terms of the operating conditions so that the supplier specialists can make their recommendations on the basis of the most complete and most pertinent information. The user specialist can assess the relative merits of several solutions that may be offered and arrive at the most economical one with a minimum of uncertainty. The user specialist can recommend changes in operating procedures so as to permit more economical solutions or, in some cases, make any solution practical.

What all this adds up to is the need for a greater recognition by management of the importance of specialized attention to corrosion. This may require one or more corrosion engineers designated and trained as such who will have the confidence and support of management and who will be given

(Please turn to page 50)

SEE CORROSION FEATURE — PAGE 51

Corrosion spotlight section starts on page 51. Here you'll find latest developments for fighting corrosion, case histories, corrosion key data, and stories on alloys, glass, plastics and other ideas to aid you in the battle against corrosion.



EXAMPLE:

Removing a Process "Stumbling Block"

In working out the processing of a new synthetic resin, the de-watering step posed a serious problem until tests showed that the Bird Continuous Centrifugal Filter could meet all process requirements, as well as preventing the solids build-up or fusion previously thought unavoidable.

EXAMPLE:

Achieving an Efficient Wash *Continuously*

Before visiting the Bird Research and Development Center, one user doubted the ability of the Bird Continuous Centrifugal Filter to wash adipic acid solids as efficiently as could be done in a batch centrifugal. Test results showed that an unwashed cake containing .76% impurity, was washed in the Bird to 99.99% purity with only .55 lbs. of wash per lb. of dry solids — results equal to any ever obtained with batch equipment.

EXAMPLE:

Speeding Up Production and Lowering Solvent Losses

In the process of recovering inedible cocoa butter from expeller cake, one of the steps involves removing 5% entrained solids from an oil rich solvent. Unhappy with results being obtained, the processor had the Bird Research and Development Center make tests which showed that the Bird Continuous Centrifugal Filter could do the job at a greatly increased production rate with an appreciable reduction in solvent loss. Special vapor-tight construction of the Bird is a big advantage on applications like this.

EXAMPLE:

Making the Grade When Operating Conditions Get Tough

In a "detinning" plant, existing methods of recovering sodium stannate from a dissolving solution proved wholly inadequate when the strength of the caustic solution had to be sharply increased to handle a new type of lacquer being applied to the tinned sheet. Tests made on a sample of the dissolving tank slurry showed that a Bird Continuous Centrifugal Filter handled this tough job efficiently, recovering practically all of the tin value.

This "Baby" Bird proves what its Big Brother can do . . .

BEFORE YOU BUY YOUR FILTERING EQUIPMENT

The Bird Research and Development Center has the pilot-scale facilities and equipment to prove to you exactly what you'll be getting in terms of moisture removal, tonnage, filtrate clarity, washing efficiency and cost per ton — in advance of your investment in equipment. Why not make use of these unsurpassed test resources whenever you encounter a solids-liquids separating problem?



A corner of the test floor of the Bird Research and Development Center, showing the feed tank mezzanine. Feed and filtrate up to 2500 gallons are readily handled.

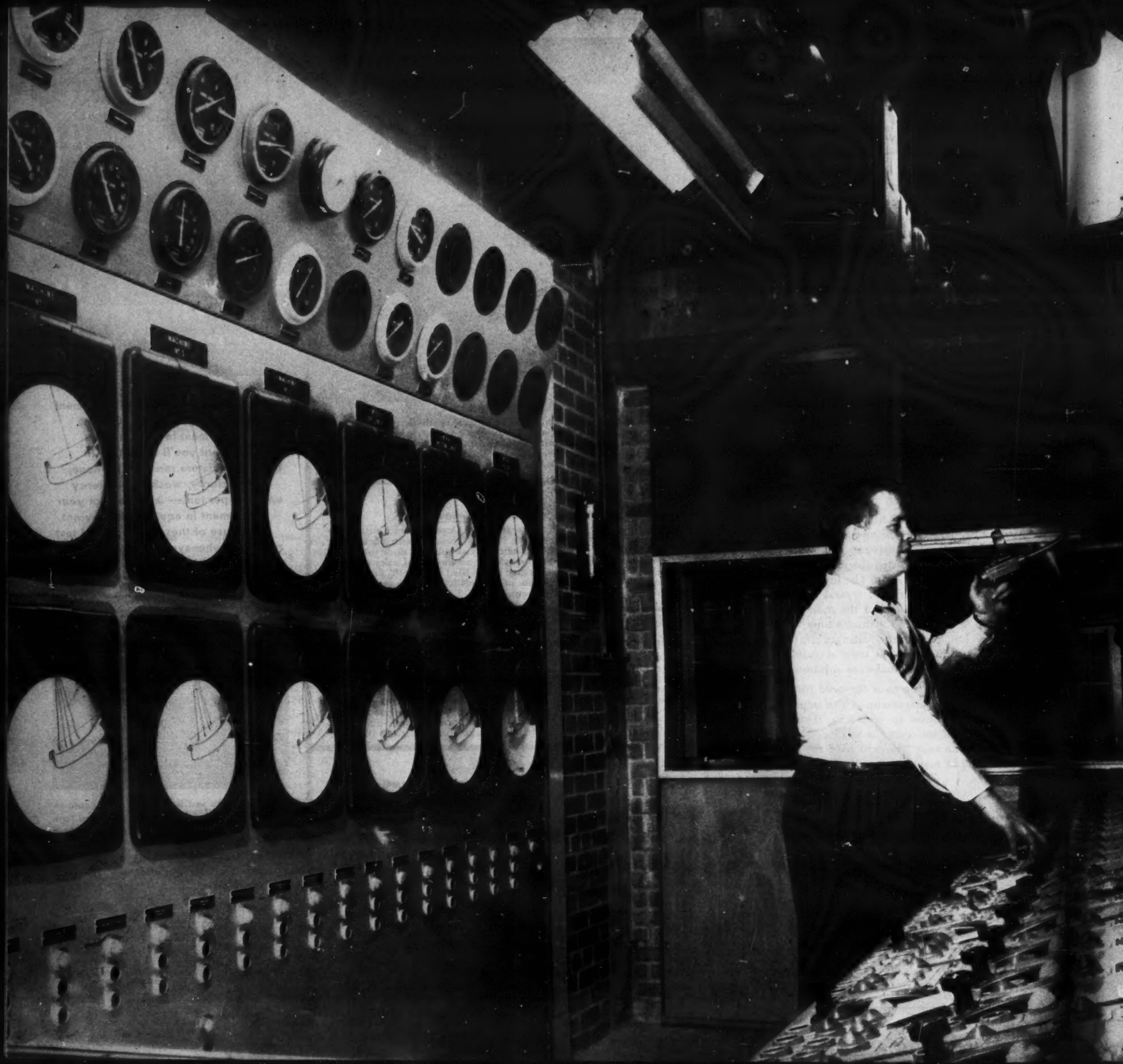
BIRD

Leading Authority on
Solids-Liquids Separations

- Builders of
- Bird Continuous Centrifugal Filters
 - Bird-Prayon Continuous, Rotary, Horizontal Vacuum Filters
 - Bird-Young Continuous Rotary Vacuum Filters
 - Bird Horizontal Tank, Vertical Leaf Pressure Filters
 - Bird-Humboldt Screen Type Centrifugal Dryers
 - Bird Suspended Centrifugals • Bird Centrifugal Clarifiers
 - Bird Continuous Centrifugal Coal Filters • Bird Polishers
 - Bird Centrifuges for delicate Chemical Filtration

For specific information on individual machines write Bird Machine Company, South Walpole, Massachusetts. Regional Offices: Evanston, Illinois • Portland, Oregon

When inquiring check 6334 opposite last page



Five paper machines making a wide variety of specialty
paper . . . obsolete stock preparation system . . .
heavy labor costs . . . this was the situation at
Howard Smith Paper Mills in Cornwall, Ontario until . . .

pulpers replaced beaters and modern process control system replaced extensive supervision

**Effect has been substantially improved labor
efficiency, uniformity of product, and clear
record of what was done**

Howard Smith Paper Mills, Ltd. (Cornwall, Ontario) operate five paper machines. Four of these produce fine paper; the fifth, boxboard. Board machine takes three furnishes — top liner, filler, and bottom liner. Thus, seven beaters were needed to prepare stock. Each of these beaters required a blend of pulp from soda, sulfite, and broke. And in addition, most stocks required size, alum, and clay.

In a move to streamline operations, the mill switched from beaters to pulpers in 1954. At the same time, a graphic control panel was installed to supervise this operation.

Panel board behind console was set up to record exactly what happens in each of the pulpers. Con-

sole itself is located so that operator looks out over stock preparation floor. Thus, he is able to see all operations at any time.

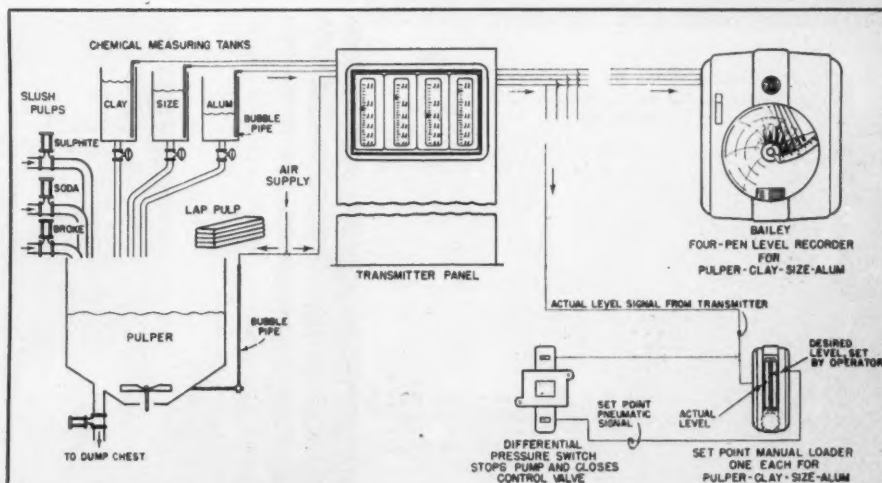
Each section of the console is arranged so that operator can adjust for a desired level of pulp to be added to pulper. On either side of this loading control are located pumping start buttons for sulfite, soda, and broke. Operator sets quantity to be added, presses start button for type of pulp, and control system takes over.

Pressing the button opens slush valve for selected pulp. If pumping system is already in use (filling another pulper) nothing happens. If pumping system is not in use, interlocks permit cycle to begin.

(Please turn to page 17)

From his post in the control room, operator has all controls for pulper at his fingertips, can see entire stock preparation floor through glass enclosure, and can refer to record of all important variables on panel board behind him

Centralized control layout for paper mill stock preparation



Magnesium anodes cathodically —

PROTECT COOKING KETTLE AT PETER HAND BREWERY

setup makes anode replacement easy

FRANK E. McELROY, Assistant Editor
With **VICTOR A. ECIMOVICH**, Brewmaster
Peter Hand Brewery Company, Chicago, Ill.

Problem: Corrosion in a 6000 gallon lauter tub (cooking kettle) at Peter Hand Brewery in Chicago reached serious proportions two years after tub was installed. Severe pitting was noted, especially in bottom of tub.

Lauter tub, which is made of steel and brass, was installed in 1945. Its diameter is 18 feet. A malt mash is processed in the tub at a temperature of 165°F and under continuous stirring. The liquor that is formed is called wort, and is slightly acidic (pH 5.4). After this, processed wort is cooked further, ending up some months later as premium beers.

Solution: This corrosion problem was attacked two ways: repair and prevention. Pitting damage was repaired by brazing a coat of stainless steel on bottom of lauter tub. Secondly, additional corrosion damage was allayed by providing for cathodic protection, as follows:

Underneath the raised perforated brass "false" bottom, company engineers placed a series of concentric circles, made of brass. These are used to

support about 84 metal anode bars. Bars are set so that they fan out from the center of the tub where the shaft is located. Thus each of the eight circles has an increasing number of bars.

Magnesium was chosen as the anode metal because it was higher on the electromotive series than brass, and would not affect the delicate flavor of the beers.

These anode bars are made in brewery shop by threading one end of a special $\frac{7}{8}$ inch OD magnesium bar that contains a $\frac{1}{8}$ inch diameter steel core. Bars are two feet long. (See Fig 1.) The threaded bars are then screwed individually into brass nuts in the circles on the tank bottom.

Results: No corrosion of lauter tub has taken place in the eight years it's been protected. The magnesium anodes are renewed every six months. This job takes just a couple of hours of downtime.

(Magnesium bar stock is a product of Dow Chemical Co., 1000 Main St., Midland, Mich. . . or for more information check 6335 on form opposite last page.)



Fig 1—Closeup of how the $\frac{7}{8}$ inch by 2 foot long bars are threaded for connection to bottom of lauter tub

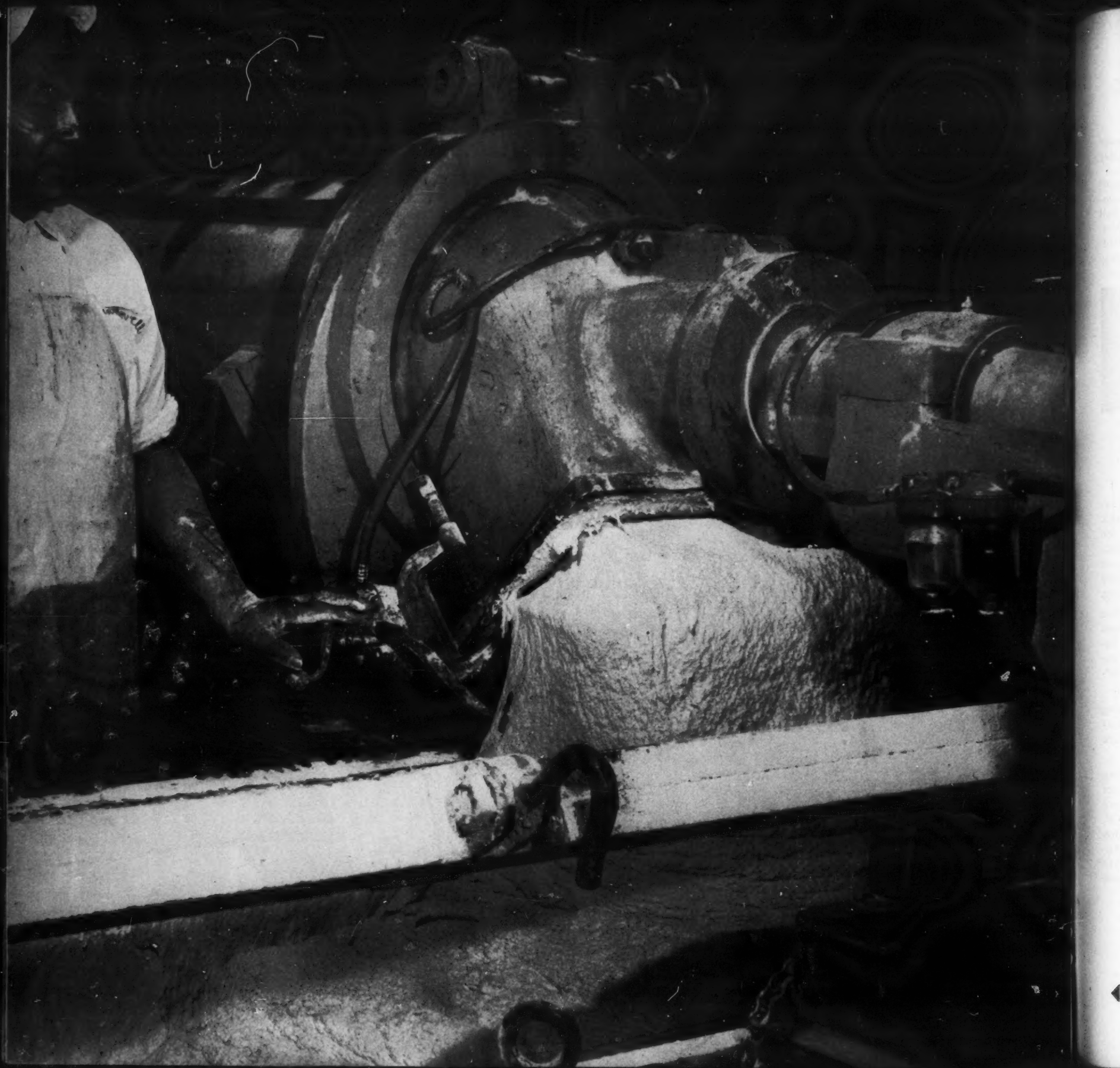
Fig 2—Lauter tub is 18 ft in diam, has stirring shaft in center. Wort is formed by processing malt mash

CP Staff Photos

Fig 3—Brewmaster Victor Ecimovich (right) and Assistant Brewmaster Willard Neeb (to left) check conditions in cathodically protected lauter tub







As every engineer knows, switching over to a continuous process can pay dividends. Here's a company that made the change in its dough mixing. Not only does a continuous mixer give better results at lower costs, it also . . .

boosts dough production 100 percent

TED F. MEINHOLD, Assistant Editor

With **H. W. LOGSDON**, Plant Superintendent
Keever Starch Company, Columbus, Ohio

Problem: Mixing water and wheat flour to hydrate the gluten was a slow and laborious operation at Keever Starch Company, Columbus, Ohio. The job was strictly a batch operation performed in a conventional bakery-type mixer. Unit was filled and emptied manually. Operator would add about 475 lb water to 800 lb flour, run the mixer for 5 minutes, and then empty it. Total elapsed time: 8 minutes. Operation was repeated over and over again 24 hours per day, 6 days a week.

After the hydration step, the starch is separated from the dough by a washing process. It is then further processed and refined into final products. Company produces "Victor" industrial starches for textiles, corrugated boxes, paper manufacturing, adhesives, and laundries; "Kesco" edible starches for cake mixes, confections, doughnut mixes, and soup thickeners; and wheat gluten for soup stock, flavorings, cereals, breads, macaroni, and other edible and industrial protein uses.

Solution: In November 1954, company replaced the batch mixer with a continuous mixing and

kneading device which has made the entire operation virtually automatic. Flour is charged by means of a screw conveyor into the machine's hopper, located on top of one end of machine. Here it is sifted and automatically fed into the mixer at a pre-determined rate. Water enters mixer simultaneously through a separate line, flow rate being controlled.

Machine consists essentially of a worm blade revolving in a trough. Blade has gaps at regular intervals that correspond to kneading teeth in the trough. Worm blade is operated by a driving gear that produces a horizontal movement so coordinated with the rotary motion of the blade that the gaps meet and pass the kneading teeth as the worm revolves.

Material entering machine is forced forward by the worm blade until it comes to a kneading tooth. As blade passes tooth, it forces a part of the material with it and leaves part behind for further mixing. Process is repeated along entire length of trough as blade passes each tooth. Thus, each tooth, working with the gaps in the worm blade, acts as an individual mixing machine. Operation results in a uniform, fully blended product being ejected at the discharge end of machine.

Mixer is adaptable to a complete range of materials from light solids to viscous pastes. By chang-

ing the number and shape of the kneading teeth to suit the material being processed, practically any desired result can be achieved. Hourly output and holding time are simple to regulate.

Results: Installing the continuous unit has resulted in more uniform mixing, better efficiency, and practically a 100% boost in production. Machine turns out approximately 1200 lb dough every 4 minutes — as compared to 1275 lb every 8 minutes with the old mixer. Furthermore, loss of product as scrap (resulting from the numerous charging and discharging operations) has been virtually eliminated.

Operating costs have been substantially reduced. Since the operation is now essentially "push-button", operator is required only part of the time (emptying product container) — releasing him for other duties in the plant. Safety devices on mixer automatically shut down unit in case of deviations in flow of materials.

Power costs are also lower. Machine uses only a 30 hp motor, while old unit required 60 hp motor. Mixer is self-cleaning and, because of its simplified construction, requires very little maintenance.

(Ko-Kneaders are manufactured by Chemical Machinery Division, Baker Perkins Inc., Dept. CP, Saginaw, Michigan . . . or for more information check 6336 on form opposite last page.)

Mixing water and wheat flour to hydrate the gluten is now a continuous operation with this unit at Keever Starch Company

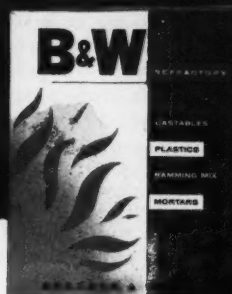


Mixer turns out about 1200 lb of dough every four minutes

What are your refractory castable problems

- High Temperatures?
- Abrasion and Erosion?
- Slag Attack?
- Overhead Applications?
- Insulating Properties Required?

B&W makes a wide range of specialized refractory castables. Whatever your problem, you will find helpful data in B&W Bulletin R-35. Send for your copy today.



of Products and Uses

| Castables | Page | |
|--|-------|---|
| B&W Kaocrete-32 Special High Temperature Service—To 3200 F | 7 | B&W Kromecast Chrome-base Castable for Resistance to Attack of Slag and Other Reactive Products—To 3100 F |
| B&W Kaocast High Temperature, General Purpose Use—To 3000 F | 8-9 | B&W Hydrochrome Chrome-base Castable for Resistance to Attack of Slag and Other Reactive Products—To 2800 F |
| B&W Kaocrete-A General Purpose Use—To 2700 F | 10-11 | Insulating Concrete-Mixes |
| B&W Kaocrete-B For Ease of Plastering in General Purpose Use—To 2300 F | 10-11 | B&W Kaolite-20 • Kaolite-20-Gun B&W Kaolite-22 • Kaolite-22-Gun For Castable Convenience Plus Insulating Effect |
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THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
CENTRAL OFFICES: 101 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

NEW SOLUTIONS

Vibrating screen separator solves screening problem in oxide plant . . .

handles wet ball mill discharge continuously 24 hours a day

Problem: Conventional classifiers were unsatisfactory in continuous classification of wet ball mill discharge at the Oxide Division of Monolith Portland Midwest Company, Laramie, Wyoming.

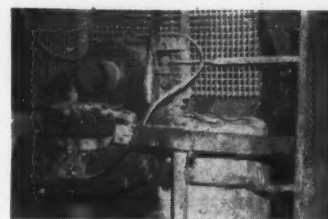


Photo shows small amount of space required for 18"-diameter vibrating-screen separator (arrow) handling discharge from wet ball mill (rear)

Product consisting of a highly cementitious dicalcium silicate-caustic material, would hydrolyze in the classifier bowl and floating islands resulted. This greatly reduced classifier efficiency, ultimately causing shut-downs for cleaning.

Solution: Company installed an 18"-diameter vibrating-screen separator for this operation. Because particle size should not exceed 0.05", a 14-mesh, 0.0510"-opening screen cloth is used.

Results: Separator is doing the job efficiently on a 24-hour/day basis for weeks at a time without shut-down.

(Model H-1D3 Sweco vibrating screen separator is product of Separator Division, Southwestern Engineering Company, Dept. CP, 4800 Santa Fe Avenue, P.O. Box 58264, Vernon Station, Los Angeles 58, California. Check 6337 on form which is located opposite last page.)

For more information on product at left, specify 6338 . . . see information request blank opposite last page.

Modern

(Continued)

Start button switch which in the pulper is essential pressure valve.

Operator of another

Chemicals that each measuring for clay, s measure on He is then required. filled with pulps in



at this point Clay is du added, alu cally inter

While th console sh Operator Any pulp on the cor behind op shows lev in measu quantities to the pul

An impo

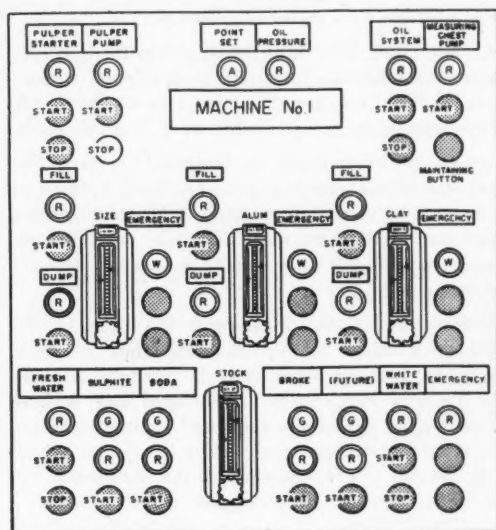
Modern Process Control

(Continued from page 11)

Start button opens valve. Valve, in turn, trips a limit switch when open. This starts slush pump. As level in the pulper reaches predetermined set point, differential pressure switch shuts down pump, closes valve.

Operator readjusts set point for additional quantity of another type of pulp. Cycle is repeated.

Chemicals are added in much the same way, except that each pulper has its own set of three chemical measuring tanks. Operator can adjust set points for clay, size, and alum and press start buttons to measure out chemicals while pulper is being filled. He is then ready for addition of correct amounts as required. In a typical operation, pulper is partially filled with one kind of pulp and held there. Special pulps in lap form are sometimes added manually



Drawing shows one section of control console

at this point. Some white water may also be added. Clay is dumped into the pulper for mixing, size is added, alum is the last to be added in this electrically interlocked sequence.

While this is going on, recorders mounted above console show dump chest and machine chest levels. Operator must refer to these when dumping a pulper. Any pulper may be dumped by pressing the button on the console. On main recorder panel (immediately behind operator) four-pen recorder for each pulper shows level of pulp, levels of clay, size, and alum in measuring tanks. These charts also show exact quantities of each chemical used, order of addition to the pulp, and mixing or holding time.

An important feature in this installation is capil-
(Please turn to next page)

Out of the Engineer's Workbook...

The circuit illustrated above utilizes a Reineveld 28" Centrifuge, replacing three vertical machines formerly used in the process.

Man power requirements are reduced from 8 hours per shift to only one occasional visual inspection. This is made possible by Reineveld's completely automatic cycle of operation.

This centrifuge is fed, washed and discharged at full operating speed. It is jacketed to prevent heat loss and vented to remove toxic fumes.

For complete details, consult with a Heyl & Patterson sales engineer.

Heyl & Patterson

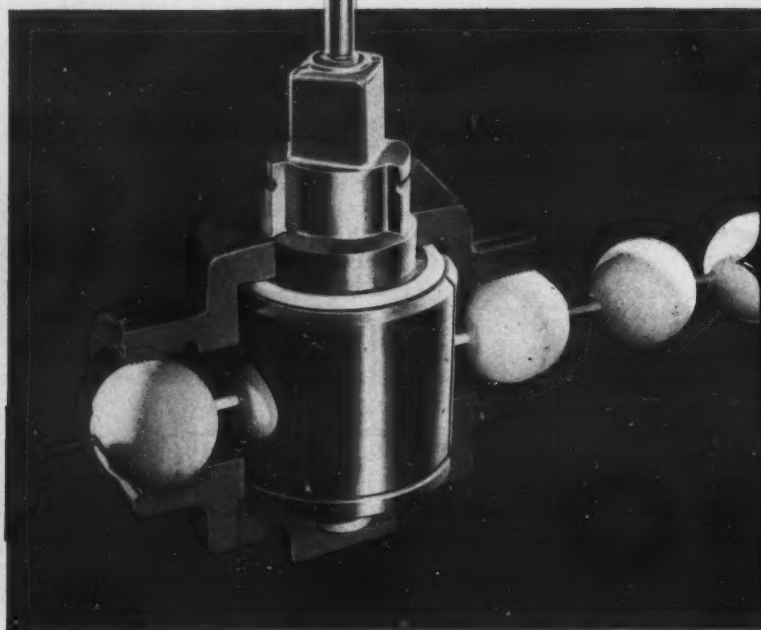
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When inquiring check 6339 opposite last page

Q C f

Lubricated Plug Valves



ROUND PORT

MEANS

FREE FLOW

ALL

THE WAY

You get full volume, unrestricted flow throughout the entire piping system when you use QCF Round Port Valves.

The pipe-matching port openings cause no loss in head pressure—offer no more resistance to flow than the pipe itself. There are no obstructions—no turbulence and no harmful abrasive effects from solids in suspension. Even the most heavy viscous ladings flow freely through QCF Round Port Valves.

Split-second quarter-turn shutoff, non-wedging cylindrical plug, Teflon* head gasket, are additional advantages that add to perfect performance of QCF Round Port Valves—that mean extra long trouble-free service—lower maintenance costs and fewer work stoppages.

Act now to step up valve performance—to keep maintenance costs down. Representatives in 50 principal cities.

*DUPONT TRADE NAME

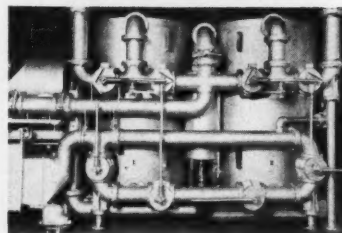
W-K-M MANUFACTURING COMPANY, INC.

A SUBSIDIARY OF QCF INDUSTRIES
INCORPORATED

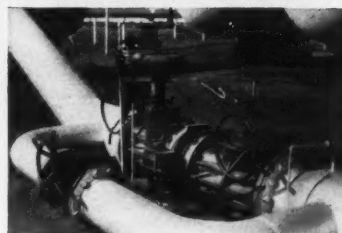
PLANT: MISSOURI CITY, TEXAS • MAILING ADDRESS: P. O. BOX 2117, HOUSTON, TEXAS



In salt water disposal plant.



Absorptive dryer installation.



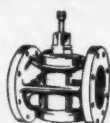
In natural gasoline plant.

MANUFACTURING

**W-K-M
THROUGH-CONDUIT
GATE VALVES**



**Q C f
LUBRICATED
PLUG VALVES**



**KEY
RETURN BENDS
AND FITTINGS**



When inquiring check 6340 opposite last page

NEW SOLUTIONS of processing problems

Modern Process Control

(Continued from preceding page)

lary pen system which eliminates "poisoning" of intersecting records. Clarity at intersections of the traces is important in interpreting these records.

In addition to the instrument system, a two-way loud-speaker communication system keeps panel board operator in close touch with pulper crew. This feature has been found essential to smooth functioning of operations. Another feature of the modernized process is a pneumatic tube system which delivers samples of each turn-up for tests.

Changeover to centralized stock preparation control room has resulted in reduction of labor requirements from three to one men per pulper and to a composite crew equivalent to only one man per machine. Operators have found equipment easy to use. They are, in fact, enthusiastic about the arrangement. One operator now handles all seven sections of the console and assumes full responsibility for preparation of all furnish for the machine.

An interesting note during startup was the discovery in records that one batch had been released without size . . . clay was introduced twice to another batch. Operators have accepted this as a helpful guide.

System has been found so foolproof, in fact, that pH tests on each batch of pulp (to check addition of alum) have been discontinued. More important, perhaps, is the fact that resin size additions are now recorded — there was no satisfactory test for them in pulp.

Maintenance of the instruments has been simple. These recorders use precalibrated units for each variable. Each of these units is complete and can be replaced by a spare precalibrated unit without disarranging any of the associated equipment. Thus, in event of trouble, a spare keeps the system operating. Actual trouble-shooting of the instrument can be carried out at any convenient time.

(Instrument console and four-point roundchart recorders were furnished by Bailey Meter Company Ltd., Canadian subsidiary of Bailey Meter Co., Dept. CP, 1050 Ivanhoe Road, Cleveland 10, Ohio . . . or for more information check 6341 on form which is located opposite last page.)

Yes . . .

CHEMICAL PROCESSING

is "different!"

There are good reasons why!

See letter from the Editors, page 118.



Trends . . . John C. Vaaler and Bruce Fader
discuss the significance of current happenings in . . .



Chemical Business

Our chemical processing industries (already fifth largest in sales, fourth in assets are growing three times as fast as industry in general (nine percent versus three percent) and have quadrupled in size in the past 25 years.

Because these fast-paced business developments affect methods and management — and frequently the direction in which chemical industry can grow — CHEMICAL PROCESSING began a news service called CHEMICAL BUSINESS a few years ago. With the pace of our industry quickening, this news service is now being brought to all readers of CHEMICAL PROCESSING in this form.

In this issue . . . and in the months to come . . . you'll find the meaning and significance not only of technical developments which can spell major change for us, but also the tides and currents that indicate where we are headed, what has been accomplished, and what is likely to be the course of events to come. This service is designed to produce a distillation of meaning from the bulk of information gathered through the news sources of CHEMICAL PROCESSING.

Naturally, if you have comments and suggestions about our CHEMICAL BUSINESS service, we'll be happy to know of them.

Here, then, are salient features of this month's chemical scene . . .

Chlorine-caustic settling down?

Painting a cautiously rosy picture of the future chlorine-caustic balance, **Donald L. Taylor**, general development manager at Hooker, says the problem "is not expected to present serious marketing difficulties for the industry in the foreseeable future. "However," he says, "this does not mean that the industry will be free of geographic and company problems with respect to chlorine-caustic balance."

Root of the problem . . . chlorine has had an average growth rate of about 12 percent yearly for the past 25 years, but this has dropped to 10½ percent over the past five years and within the next half-decade should decrease to about 8 percent, thereafter leveling off at around seven percent.

"In contrast," Taylor said, "demand for caustic in the past 25 years has grown at an average of about 7 percent yearly, and is expected to stick to this rate for the next five to ten years."

Biggest question mark in the chlorine picture . . . titanium and zirconium production (See "Zirconium Anyone?" next page) If projected demands for titanium are realistic, the chlorine demands could be tremendous.

The Real Problem

. . . in fighting corrosion in the chemical plant is not finding the general information you need, says International Nickel v-p **F. L. LaQue**, but having the specific and economical answer to a specific case of corrosion in your plant. Suppliers and larger chemical companies can do this with staff corrosion experts. If you are a small chemical organization, without "experts", what can you do about it?

Plenty, points out LaQue, in his editorial this month . . . \$100,000 a year is going to be spent in finding more corrosion answers. The spender: Corrosion Research Council. The sponsor: Engineering Foundation. The supporters: Plants like yours. Don't miss page 8 to find out how you can help.

Glass-lined pump

. . . they've done it! Pfaudler and Goulds Pump teamed up to build the first commercially acceptable glass-lined centrifugal pump. While there were more than two problems to lick, two — escaping hydrogen and sharp corners — were dillies.

In the new line of pumps, sharp corners have been eliminated by grinding. A simple solution to glassing, this approach left development work to be completed in pump design.

(Continued on page 20)

(Continued from page 19)

Hydrogen, evolved when glass reacts with metal parts during lining process, is ordinarily no problem . . . it simply leaks off through the metal. But in a design that called for completely encasing some parts in glass, special techniques were needed. Pfaudler managed to get rid of hydrogen without harming glass . . . though is not saying just how.

Upshot is the pump described on page 94 which will stand 150 psi and pH from the most acid to 12. And **all parts** coming in contact with the material pumped are lined.

Plan for expansion of silicones

. . . at General Electric's Waterford, N. Y., plant has been developed. Silicone products division has acquired another 60 acres, bringing over-all plant site to more than 160 acres. Waterford plant is a completely integrated silicone production unit.

Zirconium anyone?

Important result of the contracts just let by the AEC will be greatly increased amounts of zirconium available to private industry . . . probably at less than half the previous reactor grade (hafnium free) material price. (Present toll for pure zirconium is around \$14 per pound . . . lowest stated price to the AEC under the new contracts "is indicated to be less than \$5." Prices to the trade will be "somewhat higher.")

The AEC's total contract is for something like 11 million pounds, stretched over the next five years. National Distiller's USI has announced that a third of its 1½ million pound annual production will be available to industry. Carborundum's new operation in West Virginia will boost its output to the

(Continued on page 129)

Our Growing Industry

Expanded volume in barium

. . . already strong in 1956, has led Westvaco Mineral Product Division of FMC to expand production of barium oxide by 30%. The Modesto, California, plant expansion is based upon a new process — result of several years of research and pilot development. Look for Westvaco's announcement to increase production facilities for phosphorous, also.

Sales of General Tire's Plastic Division

. . . over \$70 million in 1955 . . . has caused its Chemical Division — major supplier of vinyl resins — to boost production schedules by a million pounds a month. General's chemical operations along Lake Erie's "Chemical Shore" at Ashtabula, Ohio, will be enlarged.

Additions already under construction will enlarge the finishing and polymer buildings. Another rotary dryer will be installed, plus five more reactors, and two more 14,000-gallon blending tanks. The Ashtabula plant was only 18 months old when the 50% expansion was initiated.

Sign of continuing boom?

Recent rash of land purchase options taken without definite plans for plant building indicates strong management belief that the boom will continue, at least until after the election. Two typical announcements — Ethyl Corporation is taking options on land near Joliet, Illinois; Sun Oil Company has optioned 500 acres along the Delaware River in Gloucester County, N. J. Neither had made any final plans as to what use will be made of the land when they took up the options — or at least they are not talking.

Since breaking ground in March, 1956

. . . at Baton Rouge, Louisiana, for a plant to produce low-pressure polyethylene, W. R. Grace & Company has set up a Polymer Chemicals Division and acquired a headquarters and applications laboratory building in Clinton, N. J., for sales, administration, technical personnel. Decision to locate in New Jersey was dictated by convenience to eastern plastics buyers. Putting everything under one roof will knit the team closer for sales and technical cooperation.

West Coast Paper makers are demanding more wet-strength resins

. . . Hercules Powder Company has completed its West Coast plant expansion at Portland, Oregon, for resins used in wet-strength paper and board. The new unit is an addition to established facilities. Makers of paper toweling, blueprint papers, bag papers, carriers, container and separator board, V-board, other specialties are prime marketing targets.

Popularity of latex-based paints are stimulating production of HEC

. . . hydroxyethyl cellulose, Carbide and Carbon, Division of Union Carbide, is feeling the pinch — plans to enlarge production capacity. HEC is used as a protective colloid in making PVA latex. Price reductions — up to 16 cents a pound — on Carbide's Cellosize are helping.

(Chemical Business continues on page 129)

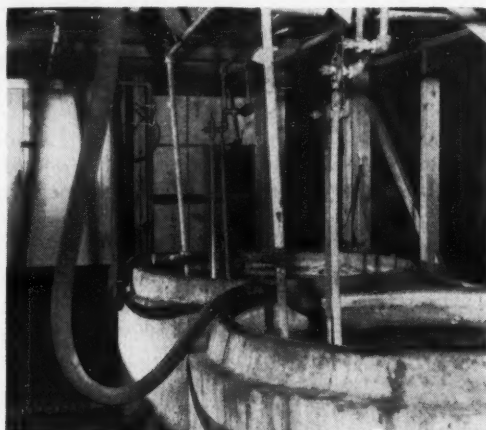
Acid hose serves over 24 months handling 50% NaOH and 15% NaOCl at John Wiley Jones Co . . .

corrosive solutions ranging from 32. to 89°F have not hurt line

Problem: Bleach manufacture at John Wiley Jones Co., Charlotte, North Carolina, required transfer and circulation of 50% NaOH and 15% NaOCl solutions at temperatures from 32 to 89°F. Chemicals were to be pumped intermittently eight hours a day, six days a week, to and from reaction vat, heat transfer unit, and storage. Pumping pressure would be about 20 psi.

In order to prevent spray of chemicals or finished bleach solution, transfer line had to be immersed continuously. Flexibility of lines was desired.

In bleach manufacturing process 50% NaOH is pumped from storage into reaction vat. Chlorine is introduced through a piping system. During



Acid hose is immersed in bleached solution 24 hours a day at John Wiley Jones Co.

reaction, solution is circulated through a heat transfer unit for heating or cooling as required. Final solution, 15% NaOCl, is pumped to storage through same lines.

Solution: In January of 1954 company installed two 12 ft lengths of acid hose to act as transfer and recirculation lines in bleach process. Hose is 1½" ID, with inner tube fabricated from Du Pont's Hypalon basic polymer, carcass of four bonded high-tensile duck plies, and pure gum rubber cover.

Results: Hose has been in continuous service since installation over 24 months ago and is still in good condition.

(Maltese Cross Hypalon Acid Hose is a product of Hewitt-Robins Inc., Dept. CP, Glenbrook PO, Stamford, Conn. . . . or for more information check 6342 on form opposite last page.)

Factory-Assembled Lineup Offers

5 Important Advantages



1. Centralized Control — All high voltage control for an entire department or plant may be concentrated in one place. When located in a separate control room, starter lineup operates in cleaner atmospheres. It also may be made inaccessible to unauthorized personnel.

2. Low-Cost Installation — Control group is factory-assembled *and bussed*. Conduit layout is greatly simplified. For example, lineup requires only one incoming power feeder.

3. Simplified Expansion — Internal bus and convenient wiring provision plus standardization of cubicle size facilitate addition of starters. Each starter unit is self-contained.

Expanding the lineup is merely a matter of adding a starter and connecting the bus.

4. Attractive Appearance — Uniformity of cubicles presents a modern, streamlined appearance.

5. One-Company Responsibility Complete responsibility for assembling proper control devices and for control performance rests with Allis-Chalmers.

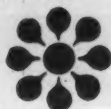
A-4704

For complete information, see your A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

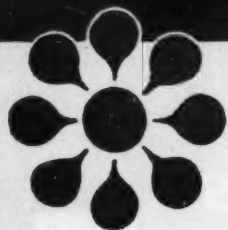
ALLIS-CHALMERS



When inquiring check 6343 opposite last page



One of six 51-foot liquid chlorine horizontal storage tanks built and tested by Newport News to meet A.S.M.E. Code requirements. This pressure vessel was welded by Union melt machines. Pressure vessels undergo stress-relieving treatment in our ovens.



Large Units...

single or multiple

*Built with careful attention to detail
by specialists in Metal Fabrication*

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NEW SOLUTIONS of processing problems

Uses asbestos disc filters to remove pyrogens by filtration...

vacuum pull rather than pressure push is used to force water through press

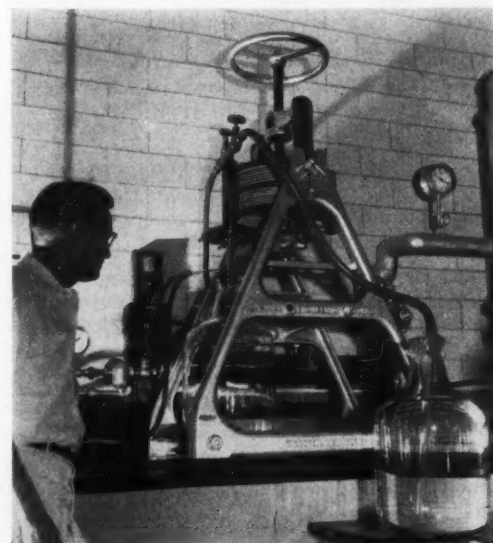
Problem: Distilled water used by G. D. Searle and Company in Skokie, Illinois, must be completely free of pyrogen materials, by-products of micro-organism metabolism. Pyrogen may be spray air-borne. Distilled water is used for preparation of intravenous solutions.

Solution: Filter was installed for retention and removal of pyrogens and bacteria using double bank asbestos disc filters. Water is forced through the press by vacuum "pull" rather than by pressure. (Another procedure requires use of a counter pressure by gas such as nitrogen to maintain a very low constant pressure.) Distilled water receives two consecutive filtrations through the asbestos filters. Filtrate is then pulled through a fiber eliminator to remove asbestos fibers which may have been picked up during filtering.

Filter is steam sterilized every eight working hours. Asbestos disc filters are changed at required intervals.

Frequent tests of distilled water insure its sterility. Both conductivity and injection tests are used. (Injection tests require preparation of saline solution for injection into rabbits. Temperature rise per unit period of time is measured.) Finished drug solutions are not tested as drug reaction on animals would disguise test for pyrogens.

Distilled water is automatically double distilled.



CP Staff Photo

Distilled water from five-gallon carboy at right is pulled through vertical press by vacuum. Fiber eliminator is just above receiving carboy

Two pyrogen and bacterial retentive filter sheets are located one above the other separated by a collecting ring. Distilled water passes through upper filter sheet and accumulates in collector ring. Built-up pressure causes the water to be passed through the lower sheet.

Operating position of the stainless steel filter is upright. Filter press is turned horizontally only for loading disc filters.

Results: Pyrogen and bacterial-retentive filters have been used by G. D. Searle and Company for several years. Conductivity and injection tests on the filtered water have consistently indicated absence of pyrogen material.

(Pyrogen and bacteria-retentive filters are product of Ertel Engineering Corporation, Dept. CP, 12-14 N. Front Street, Kingston 3, New York . . . or for further information check 6345 on form which is located opposite last page.)

Davison Chemical adds trace of molybdenum to fertilizer for better crops . . .

element has to be in form that is stable, water-soluble, and easy to incorporate

In addition to nitrogen, phosphorus, and potassium, many soils need trace quantities of molybdenum so they can successfully support certain crops. This deficiency is wide-spread. Molybdenum-deficient soils are found throughout the country; more than 35 areas are known to date.

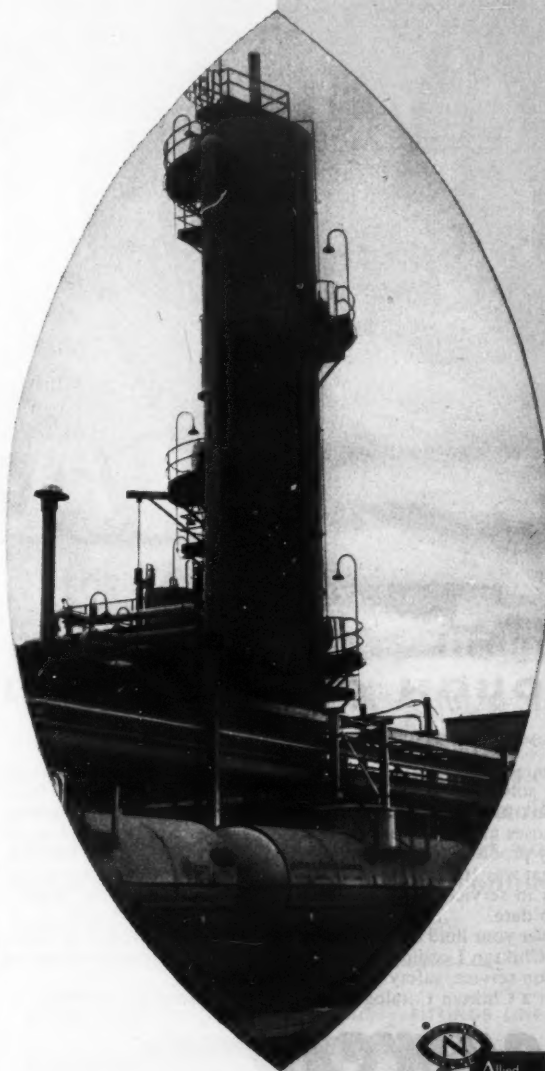
Farmers and orchard growers have added this element to the soil by spraying or dusting, or by applying with fertilizers or other agricultural chemicals. This however involves weighing and mixing of small quantities, and the inherent danger of uneven mixing.

Davison Chemical, Baltimore, Maryland, sought a way to eliminate the do-it-yourself problems. They decided to add a small quantity of molybdenum to their water-soluble, highly concentrated (20-20-20) fertilizer, which they called "Nurish." They sought a salt of this element that not only was easily assimilated by the plants, but also was water-soluble, stable, non-hygroscopic, and easy to weigh.

After investigation, Davison decided that sodium molybdate ($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$) met all these requirements. To arrive at a concentration of 0.03% MoO_2 in the fertilizer concentrate, 1.12 pounds of sodium molybdate are added per ton of Nurish. At the recommended dilution of 3 pounds of Nurish per 100 gallons of water, the final concentration of MoO_2 in the fertilizer, as applied, is 0.00010%.

(Molybdenum chemicals are products of Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. . . . or for more information check 6346 on form opposite last page.)

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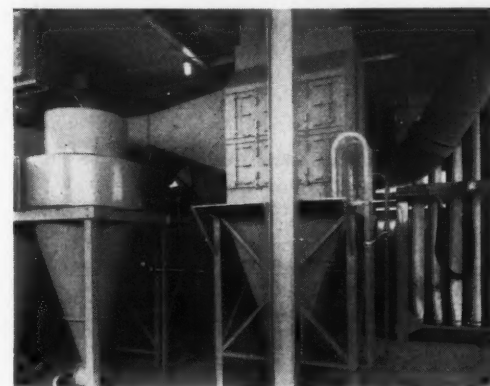
NEW SOLUTIONS of processing problems

Highly efficient dust collection for small particles furnished by multi-tube unit . . .

serves to improve housekeeping and increase recovery at Central Soya

Problem: A method for dry recovery of very fine dust particles of soybean meal was required at the Chattanooga, Tenn., plant of Central Soya Company.

Solution: When plant went into operation in April 1955, a dust collector which employs a number of miniature cyclones in the form of tubes was placed in service. This collector is used in conjunction with conventional cyclones.



After coarse particles are removed in cyclones at left, fines are taken out by multi-tube unit in center

As the soybean meal is ground in dual-screen hammermills, cooling air is drawn through collection system. Coarse particles are first taken out in two primary cyclones. Fine particles are then removed in the multi-tube unit.

This collector contains 30 or 40 tapered tubes. Dust-laden air enters tubes from unobstructed inlet manifold through tangential inlets. As air flows through tube in a helical pattern, dust is separated and discharged into hopper below. Clean air is vented through roof.

Results: Multi-tube unit increases the recovery of soybean meal. This collector recovers 100% of all dust particles down to 14 microns in size. In addition to saving product, collection system helps maintain good housekeeping both inside and out. (Microclone dust collector is product of Dustex Corp., Dept. CP, PO Box 2520, Buffalo 25, N.Y. . . . or for more information reader may simply check 6349 on form opposite last page.)

For more information on product advertised at right, specify 6350 . . . see information request blank opposite last page.

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Well, the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

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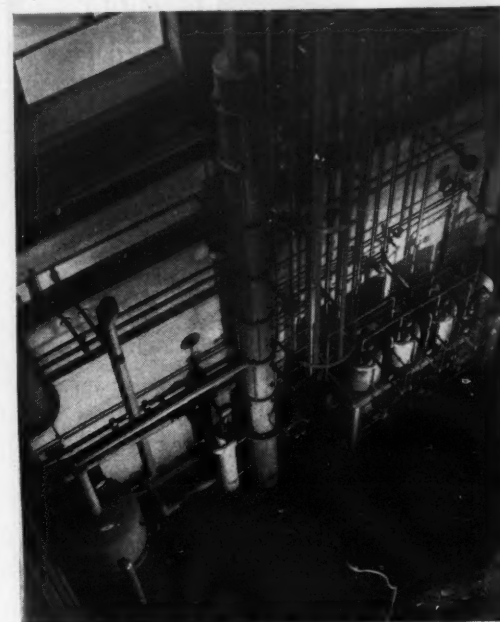
CHEMICAL PROCESSING

NEW SOLUTIONS of processing problems

**Efficient solvent recovery obtained
with packaged fractionating unit
at Wyeth's pilot lab . . .**

system handles aqueous mixtures of toluene, methanol, acetone, or amyl acetate

Problem: Recovery of large quantities of solvents used in pilot plant work at Wyeth Laboratories Chemical Development Department, West Chester, Pennsylvania, was a strong economic consideration in plant operations. Toluene, methanol, acetone and amyl acetate, together with small amounts of water, were main compounds to be



Strategically located thermometers allow accurate temperature adjustment

handled. Recovered solvent must be pure. Amount of solvent recovered was also important when calculating overall batch costs for process evaluation.

Solution: In 1953 Wyeth installed a stainless steel, packaged, fractionating unit for solvent recovery. Bubble cap fractionating column, a continuous feed boiler and 60 gal batch still-pot, steam heated, decanter, condensers, receivers, and solvent cooler, all of stainless steel, are included in package.

Feed, controlled by a Brooks rotameter, can be varied from 0.02 to 1 gpm and is supplied by a Bump pump. Column is an insulated 20 plate bubble cap unit. Steam pressures up to 40 psig are possible. Each plate is fitted with a stopcock for sampling or draining with plugs provided for additional outlets. Strategically placed thermometers provide constant check on column, feed, and distillate temperatures. Automatic liquid level controller operates bottoms pump

(Please turn to next page)

JULY 1956

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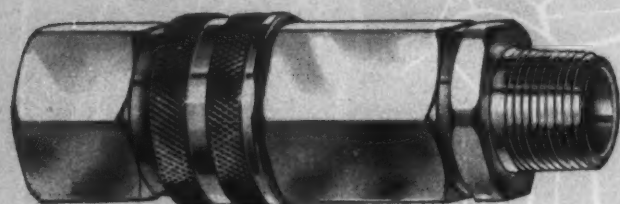
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Check the drawings (above) for typical applications. Use it as a guide to uncover new profitable uses for Quick-Seal couplings in your plant.

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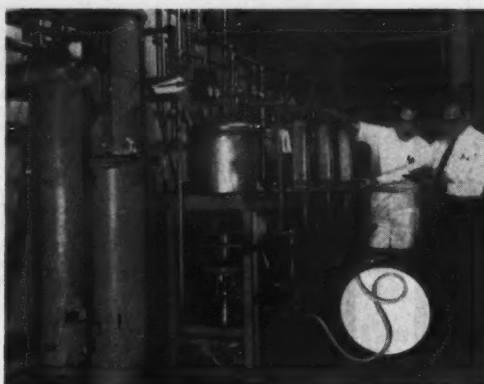
When inquiring check 6352 opposite last page

NEW SOLUTIONS of processing problems

(Continued from preceding page)

for continuous operation. Decanter permits handling of azeotropic mixtures. Sparging steam can be admitted at base of column.

Controls for feed, reflux, steam, condensers, and distillate measurement are centrally located to allow accurate, easy, one man operation. Rate of reflux and rate of distillate can be combined to obtain true reflux ratio. Operating conditions are easily modified from central control station.



CP Staff Photo

Controls for adjusting operating conditions are centrally located

Entire unit is class 1-D, with all pumps totally enclosed and meters air actuated, to provide explosion-proof conditions.

Results: Variety of solvents are handled quickly, efficiently, and with a maximum of accuracy. Purity of product is assured because of close control of operating conditions that is possible. Accurate measurement of recovered material aids in calculation of pilot plant process economics used in scaling small operations up to full plant production.

(Packaged fractionating unit is a product of Patterson-Kelly Co., Inc., Dept. CP, East Stroudsburg, Pa. . . . or for more information check 6353 on form opposite last page.)

Pressure-treated pine timbers specified for tannery roof trusses exposed to chemical fumes, humidity . . .

Lawrence Leather's 3½ acre South Paris, Maine, plant uses over 600,000 bd ft

Problem: In designing the new \$2 million tannery of the A.C. Lawrence Leather Co., prefabricated trusses were specified. These trusses were to be exposed on the underside of the roof, and would be subjected to an atmosphere contaminated with chemical fumes and high humidities incident to the leather tanning operation. Problem was to

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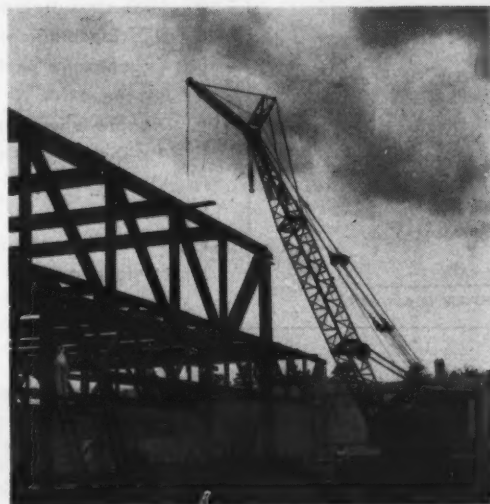
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NEW SOLUTIONS of processing problems



Scene during construction last summer. Treated wood trusses are preassembled, lifted into place

find an economical engineering material that would withstand the fumes and humidity.

The A.C. Lawrence Leather Company is a division of Swift & Company. At this South Paris, Maine, plant which opened on November 4, 1955, high quality side leathers are manufactured for the shoe industry.

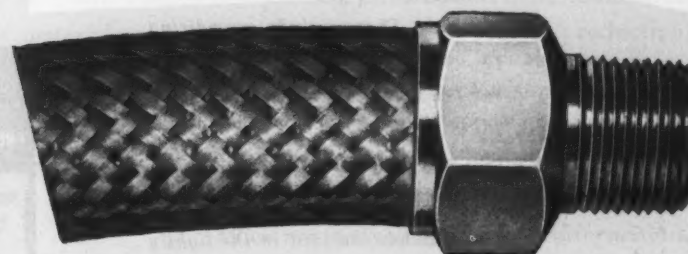
Solution: Trusses were made of Douglas fir, treated with Wolman® salts. These salts are a mixture of sodium fluoride, dinitrophenol, sodium arsenate, and sodium chromate. The wood was pressure treated at 150 psi and kiln dried. Trusses were preassembled at the installation site. This permitted brushing the bolt holes and cut ends with two coats of concentrated solution, to give complete protection. Average dry chemical retention in the wood averaged 0.35 lb/cu ft. Roof deck and trusses were left unpainted.

The Lawrence tannery is laid out in a "J" shape, all on one floor. Five hundred and forty feet long, building contains 3½ acres of floor space. Over 600,000 board feet of timber were used and treated.

Results: Management at the tannery feels that the Wolmanized timbers will satisfactorily resist the chemical fumes and humidity and will provide many years of trouble-free service.

(Wolman Salts are a product of Wood Preserving Div., Koppers Company, Inc., Dept. CP, Pittsburgh 19, Pa. Check 6356 opposite last page.)

This month's Processing and Engineering
Data section starts on page 80



**Here, there, everywhere in the plant...
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The area of solid color in the upper left hand corner of this chart* covers epoxidation reactions that could be conducted by previous commercial methods. These include epoxidizing natural oils and their derivatives which react rapidly with hydrogen peroxide or present-purity peracetic acid to give stable epoxides.

Compounds included in the lightly colored area could not be made by former epoxidation methods. For example, styrene oxide and diisobutylene oxide are too reactive to survive even mild epoxidation conditions. Others, such as 1,4-dichloro-2,3-epoxybutane require such severe conditions that they don't survive.

By using this reactive peracetic acid in an inert solvent—such as described in this article—these compounds can now be made, and it is now possible to

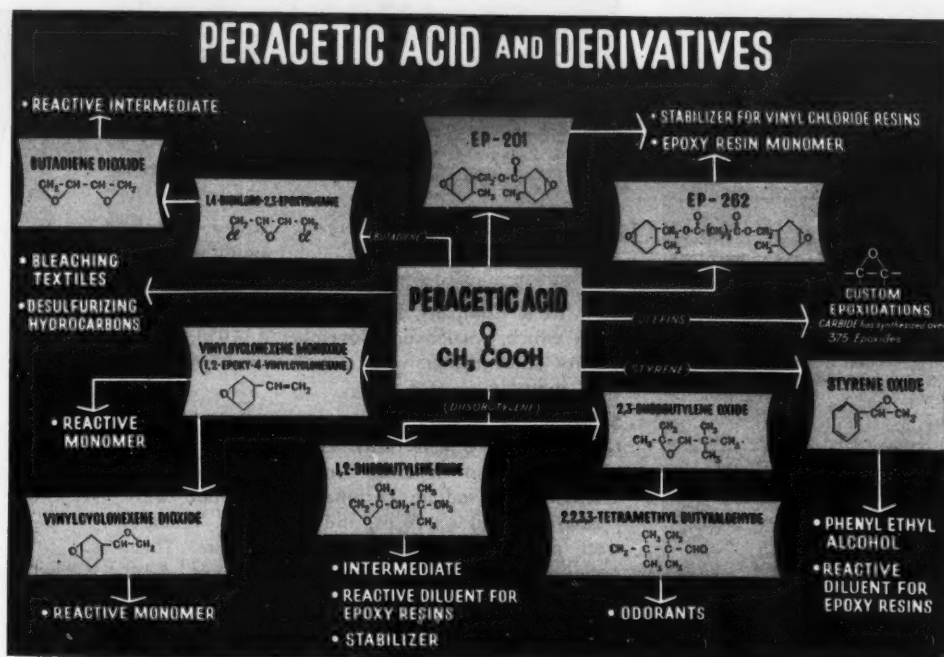
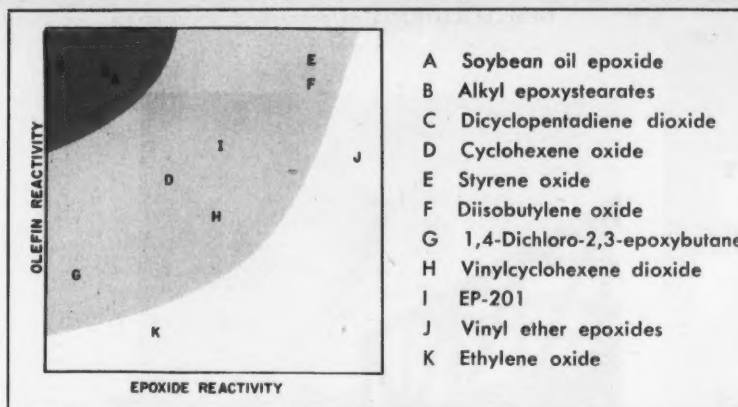


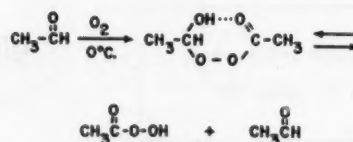
Fig 2—Typical reaction products from peracetic acid epoxidations

extend the frontier of epoxy reactions

Development of a low-cost process for air-oxidizing acetaldehyde to almost pure peracetic acid is now entering the commercial stages. Peracetic acid has been available previously, to be sure, but it has been only 45% purity and contains 35% acetic acid and 1% sulfuric acid, which causes a number of side reactions, such as opening of the epoxy ring and polymerization.

Air oxidation of acetaldehyde is not new. Carbide has been doing it for years in making acetic acid.

But by lowering the reaction 20°, so that it takes place at 0°C, and by arresting the oxidation at just the right time, a derivative of peracetic acid and acetaldehyde, called "acetaldehyde monoperacetate",



is formed. By breaking this down to acetaldehyde and peracetic acid and then separating the acetaldehyde before any reaction takes place, high purity peracetic acid is formed. Compound is an inert, anhydrous solvent which contains no strong acid or salts to catalyze side reactions.

On converting an olefin to the epoxide, the "extra" oxygen in peracetic acid is lost, so that it forms an equivalent amount of acetic acid. It is feasible for a

*Here's a graphical summary of one view of epoxide synthesis. Since it is a qualitative picture, no actual values are shown. Reactivity of olefins toward peracetic acid is plotted on the ordinate; reactivity of epoxide toward ring-opening reagents in the reaction mixture is plotted on abscissa. The upper left hand corner represents the easiest epoxidations. The further away a point is from this corner, the more difficult the epoxidation becomes.

manufacturer to funnel through the peracetic acid process all acetaldehyde which is to be converted into acetic acid derivatives. In this way, the peracetic acid can be used at a negligible raw materials cost.

The advantages of this high purity product are two-fold. The first, is that it should reduce the cost of epoxidation reactions conducted by present commercial methods, such as epoxy resins made from natural oils and their derivatives. The second, is that it extends the frontier of epoxy reactions. Peracetic acid appears to be fully equivalent to the higher priced perbenzoic acid in versatility as an epoxidizing agent.



Fig 3—Peracetic acid pilot plant studies were headed by B. J. Cotrell (left) and L. E. Hilbert

So far, over 375 epoxides based on peracetic acid have been made at company's Research Center in South Charleston, West Virginia. Many of these have never before been available to industry, and should open new fields of applications. Some of these reactions are shown in the lighter cross-hatched area of Fig 1, and are also described below.

Uses of Peracetic Acid

In addition to its established uses as a germicide and bleach, and in epoxidation of easily-reacted compounds, this high-purity peracetic acid can be used to synthesize new epoxides that should find use in making plasticizers, resins, coatings, surface-active agents, pharmaceuticals, and odorants. Typical of the compounds that can be made with peracetic acid are those which follow. These epoxides are also available in experimental quantities from the manufacturer, and are shown in the diagram (Fig 2).

Styrene oxide, made by reaction of peracetic acid with styrene, can be hydrogenated to β -phenylethanol, attar of roses. It is also a reactive diluent for epoxy resins. Isomerization gives phenylacetaldehyde, which can be used in aldol condensation or as a source of phenylacetic acid derivatives. The oxide polymerizes

(Please turn to page 31)

For the **1st** time!

META-XYLENE in commercial production

Have you considered the opportunities xylene isomer intermediates offer you for new or improved products? Or, perhaps a xylene isomer will provide you a better, more economical raw material as an alternative route in your present production.

Oronite was the pioneer and is today the leading producer of xylene isomers—the only source offering all three xylene isomers (meta, para, ortho) in commercial quantities. Inquiries are invited; trial quantities available. Contact the Oronite office nearest you for further information.

and

Oronite is your only commercial source for all 3 xylene isomers!

| Typical Data of Current Production | | |
|------------------------------------|--|-------|
| META-XYLENE | Meta-Xylene, % (wt.) | 95.1 |
| | Boiling Range, °C (start to dry) | 1.0 |
| | Specific Gravity, 60°/60°F | 0.869 |
| | Color, Saybolt | +30 |
| | Sulfur Compounds, as H ₂ S or SO ₂ | None |
| | Paraffins, % | 0 |
| PARA-XYLENE | Para-Xylene, % (wt.) | 95.4 |
| | Boiling Range, °C (start to dry) | 1.0 |
| | Specific Gravity, 60°/60°F | 0.865 |
| | Color, Saybolt | +30 |
| | Sulfur Compounds, as H ₂ S or SO ₂ | None |
| | Paraffins, % | 0.20 |
| ORTHO-XYLENE | Ortho-Xylene, % (wt.) | 86.3 |
| | Boiling Range, °C (start to dry) | 1.2 |
| | Specific Gravity, 60°/60°F | 0.875 |
| | Color, Saybolt | +21 |
| | Sulfur Compounds, as H ₂ S or SO ₂ | None |
| | Paraffins, % | 8.0 |



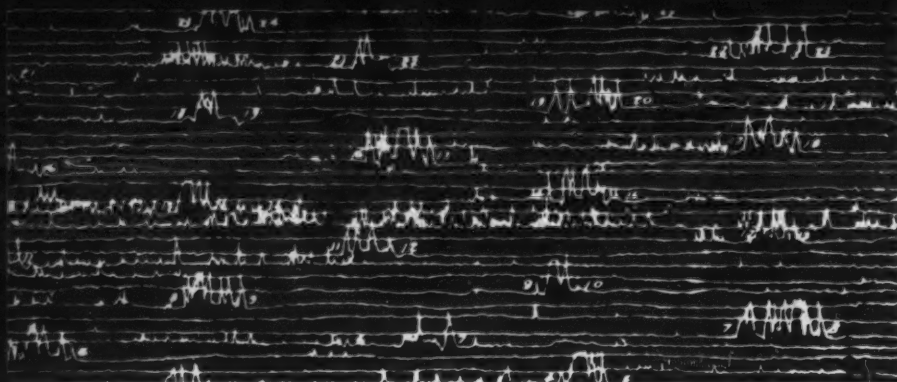
ORONITE CHEMICAL COMPANY

EXECUTIVE OFFICES: 200 Bush Street, San Francisco 20, California

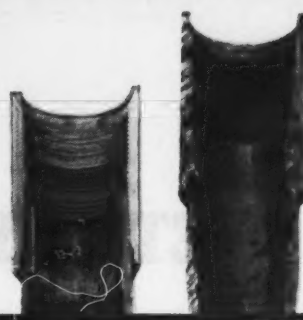
SALES OFFICES

30 Rockefeller Plaza, New York 20, N. Y. 20 North Wacker Drive, Chicago 6, Illinois
 450 Mission Street, San Francisco 5, Calif. Mercantile Securities Bldg., Dallas 1, Texas
 Carew Tower, Cincinnati 2, Ohio 714 W. Olympic Blvd., Los Angeles 15, Calif.
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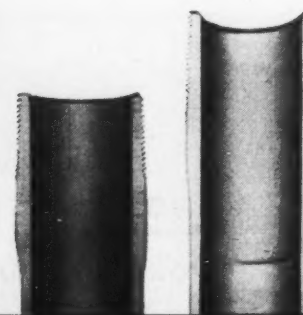
When inquiring check 6358 opposite last page



A caliper survey was made to detect corrosion of oil-well tubing. Erratic "blips" on the survey chart indicate corrosion in well using ordinary inhibitor. Parts of two corroded tubes are shown at right.



Evenly spaced "blips" in this chart show no corrosion, merely indicate tubing joints in well using inhibitor containing Sunaptic acid. The tubes look like new. Both surveys taken after one year.



Sunaptic Acid's king-size molecules give twice the efficiency of fatty, rosin, synthetic, or ordinary naphthenic acids

USED IN CORROSION INHIBITORS, A SUNAPTIC ACID CUTS
COSTS . . . GIVES GREATER PROTECTION TO OIL WELLS

In the above oil-well tests, the substitution of high-molecular-weight Sunaptic® acid for fatty, rosin, synthetic or ordinary naphthenic acids doubled the efficiency of the corrosion inhibitor.

The reason: the king-size molecules of Sun Oil Company's Sunaptic acid. Characteristic features of a typical molecular structure are: one carboxyl group per molecule, three saturated rings, and ring substituents of methyl, ethyl, or other aliphatic groups.

Sunaptic acids have other unusual properties: no olefinic unsaturation, high resistance to oxidative rancidity, low freezing or pour points, and a higher hydrocarbon solubility than fatty, rosin, and ordinary naphthenic acids.

Typical applications of Sunaptic acid derivatives include anti-oxidants, oil-soluble detergents, lubricant additives, plasticizers. A switch to a Sunaptic acid can possibly improve any product you're now making with fatty, rosin, synthetic, or ordinary naphthenic acids.

For full information on Sunaptic acids and their uses, see your Sun representative, or write SUN OIL COMPANY, Phila. 3, Pa., Dept. CP-7.

FREE TECHNICAL BULLETINS ON OTHER SUNOCO PETROCHEMICALS

Benzene, Toluene, Mixed Xylenes • Propylene Tetramer • Propylene Trimer • PDO-40 (polymerized drying oil) • Sulfonate WS (water-soluble sulfonate) • Sulfur • Anhydrous Ammonia

© SUN OIL CO.

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY PHILA. 3, PA.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL



MATERIALS

**Tests show apple fungicide
controls rust and scab,
gives good finish . . .**

has been under test in Connecticut for eleven seasons

Uses: In the agricultural chemical industry as a fungicide to spray apples.

Features: Material controls rust and scab and gives outstanding fruit finish. Tests indicate that it is of premium quality as an apple fungicide.

Description: Fungicide is based on thiram (tetramethyl thiuramdisulfide), and has been under test in Connecticut for 11 seasons and has been evaluated in trials by investigators in 16 other states. Usual recommendation for use on apples is 1½-2 lb per 100 gal of spray applied in a conventional scab control schedule.

(Thylate is a product of E.I. du Pont de Nemours & Co. (Inc.), Dept. CP, Wilmington 98, Del. Check 6359 on form which is located opposite last page.)

Outlines history and use of metallic soaps

A complete listing of metallic soaps, how they came to be, what they are, and how they are used, is contained in 32-page booklet, recently revised. Metallic soaps in common use, in industry, and in specialty uses, are discussed. Five pages are devoted to selected references and patent literature on these water insoluble compounds of any metal with any organic acid.

"Metasap Metallic Soaps" is issued by Metasap Chemical Co., Inc., Sub. of Nopco Chemical Co., Dept. CP, First & Essex, Harrison, N. J. Specify 6360 on form opp. last page.

For more information on product at left, specify 6361 . . . see information request blank opposite last page.

Peracetic Acid

(Continued from page 29)

in presence of strong acids, and reacts with most active-hydrogen compounds.

The two *diisobutylene oxides* have very different properties. The 1,2-isomer is very reactive, while the 2,3-isomer is unreactive. However, both can be used as intermediates, and both can be isomerized to the aldehydes. The 2,3-isomer rearranges to give 2,2,3,3-tetramethyl butyraldehyde, which is a solid having an odor similar to camphor. The 1,2-isomer is also an acid acceptor.

An interesting epoxide that can be made from low-cost raw materials is 3,4-epoxy-6-methylcyclohexylmethyl 3,4-epoxy-6-methylcyclohexanecarboxylate, called for short, **EP-201**. It is made from butadiene and crotonaldehyde which have undergone the Diels-Alder condensation and then the Tischenko reaction, which links the two molecules together through an ester link. EP-201 is an excellent light stabilizer for vinyl chloride resins, as the epoxide oxygen reacts with free HCl.

Another use is as a monomer for epoxy resins, and as a cross-linking agent.

Vinyl cyclohexene, made from Diels-Alder condensation of butadiene with itself, can be epoxidized to either a monoxide or a dioxide. The monoxide is a monomer for introducing epoxide rings into vinyl polymers. The dioxide is an interesting epoxy monomer and cross-linking agent.

1,4-Dichloro-2,3-epoxybutane is made from 1,4-dichloro-2-butene which in turn was made by chlorination of butadiene. The epoxide is hydrolyzed to the glycol, which on treatment with NaOH gives butadiene dioxide, a cross-linking agent of low molecular weight.

(Peracetic acid and derivatives are products of Carbide and Carbon Chemicals Corp., a div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 6362 on the convenient Reader Service slip which is located opposite last page.)

High purity synthetic substrate for use in histochemical or colorimetric studies of β -glucuronidase

Uses: For study of β -glucuronidase in tissue, either histochemically or colorimetrically.

Features: Purity of substrate is rigidly controlled.

Description: 6-Bromo-2-naphthyl β -D-glucuronide is a pure synthetic, not a biosynthetic material.

(Substrate is a product of Dajac Laboratory, Chemical Div., The Borden Co., Dept. CP, 511 Lancaster St., Leominster, Mass. . . . or for more information check 6363 on form opposite last page.)

1...2...

3... GO!

TRIMETHYLOLPROPANE

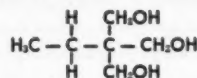
another new aldol product from Celanese

- 1 In continuous large volume . . .
- 2 With exceptionally high purity . . .
- 3 At a new low cost . . .

For all producers of polyurethanes and alkyd resins, Celanese expanded production of trimethylolpropane—in the right volume, quality, and at a new low price—is important news.

No longer will it be necessary to pass up the processing and product improvements this polyol can contribute. Now manufacturers can take full advantage of the better adhesion, color, color retention, and hardness it provides in alkyd-based baking enamels . . . the greater mixing ease it offers in compounding polyesters and pre-polymers with diisocyanates.

The way is also clear now for the commercial development of other indicated uses for trimethylolpropane—in the production of synthetic drying oils, plasticizers, surface active agents, polyesters. For working samples and prices write to Celanese Corporation of America, Chemical Division, Dept. 591-G, 180 Madison Ave., N. Y. 16.

CELANESE® TRIMETHYLOLPROPANE**Descriptive Data**

| | |
|--|-------|
| Hydroxyl value, % by wt., min. | 37.5 |
| Water content, % by wt., max. | 0.05 |
| Color (10% soln.), APHA, max. | 5 |
| Phthalic color, Gardner, max. | 1 |
| Acidity, as formic, % by wt., max. | 0.002 |

Q. Why can Celanese produce trimethylolpropane at a price well below that of comparable purity grades?

A. Through the production efficiencies and economies of expanded aldol capacity . . . special Celanese-developed processes . . . and a basic position in aldehydes.

Trimethylolpropane is the second in a new series of aldol developments and will be followed by several others—new polyols, glycols and aldehydes. Celanese® 3-Methoxy Butanol, first in the series, is already being produced in large quantities.

Celanese
CHEMICALS

*Reg. U. S. Pat. Off.

When inquiring check 6364 opposite last page

| PERIODIC CLASSIFICATION OF THE ELEMENTS | | | | | | | | | | | | | | | | | |
|---|----------------|-----------------|------------------|-----------------|----------------|-----------------|------------------|-------------------|----------------|-----------------|------------------|-----------------|----------------|-----------------|------------------|-------------------|----|
| GROUP | I _a | II _a | III _a | IV _a | V _a | VI _a | VII _a | VIII _a | I _b | II _b | III _b | IV _b | V _b | VI _b | VII _b | VIII _b | |
| 1 | H | | | | | | | | | | | | | | | | He |
| 2 | Li | Be | | | | | | | | | | | | | | | |
| 3 | Na | Mg | | | | | | | | | | | | | | | |
| 4 | K | Ca | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br |
| 5 | Rb | Sr | Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I |
| 6 | Cs | Ba | La | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | Tl | Pb | Bi | Po | At |
| 7 | Fr | Ra | Ac | Rare Earths | | | | Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho |
| | | | Ac Series | | | | | Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | |

LITHIUM DIFFERS!

Lithium, by reason of its atomic configuration and general characteristics, is rightfully included as the first member of Group I in the Periodic Table. A detailed study of the properties and reactions of both the elements and their compounds, however, shows that Lithium often resembles the metals of Groups II and III more closely than Group I. Following are some characteristic differences:

Lithium differs in organic chemistry . . .

because its organolithium compounds form a unique class with stability, solubility and activity characteristics intermediate between those of the Group I and Group II organometallic compounds.

Lithium also differs from the other alkali metals in that it serves as a unique catalyst for the polymerization of diolefins to materials of definite and predictable structure. It directs, for example, the polymerization of isoprene predom-

inantly to 1,4 addition structures.

Again, recent investigations have indicated an interesting potential as a direct reducing agent in solvents such as ammonia, low molecular weight amines, and ethylenediamine.

Lithium differs in metallurgy...

inasmuch as the affinity of Lithium for oxygen, for example, is being utilized to reduce porosity in copper and copper alloy castings. Recent research has revealed that Lithium will produce brazing alloys with self-fluxing properties and increase the wetting ability of these alloys.

Lithium differs in inorganic chemistry . . .

the usefulness of Lithium Hydride and Lithium Aluminum Hydride in the preparation of other hydrides having already been widely demonstrated. Recent studies indicate that other complex hydrides prepared in a similar manner may

prove to be interesting tools for research. The low dissociation pressure of Lithium Hydride at its melting point, to cite a specific example, is unique among all hydrides. LiH also has some slight solubility in polar organic compounds which is again unique among alkali metals.

Lithium differs in heat transfer . . .

based on its physical properties it has no equal as a liquid metal coolant. Due to corrosion caused at elevated temperatures by impurities in commercially available Lithium and Lithium Metal, Lithium has thus far found only experimental use.

Why don't you take a long look at Lithium? Its uniquely valuable differences in so many diverse fields may prove of great interest—and profit—to you. Write our PR&D department giving us details of the application you have in mind. Experimental quantities of Lithium Compounds are available on request.

... trends ahead in industrial applications for lithium



MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec • BRANCH SALES OFFICES: New York • Pittsburgh • Chicago • CHEMICAL PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check 6365 opposite last page

MATERIALS

Liquid fertilizer/pesticide mixtures are advantageous to makers, let users do field mixing . . .

special pair of anionic emulsifiers are key to these formulations

Uses: Emulsifying agents are specifically designed for use in liquid fertilizer/liquid pesticide mixtures.

Features: Advantages that the fertilizer manufacturer and the insecticide formulator will find are: 1) the smaller number of products that will now be required, 2) elimination of multiple registrations now necessary with dry formulations, and 3) emulsifiable insecticide concentrates containing these agents can be used for conventional aqueous spray applications, eliminating carry-over stock problems.

These two emulsifiers will give users a choice of many pesticides which can be field mixed in any ratio with most liquid fertilizers.

Description: Emcols H-A and H-B are anionic surface-active agents, that form emulsions with minimum agitation. They're effective with many toxicants, such as Aldrin, benzene hexachloride (BHC), Dieldrin, Endrin, Heptachlor, and Nema-gon. They can be used with liquid fertilizers such as aqua ammonia, phosphoric acid, nitrogen solutions, and mixed fertilizers with varying ratios of NPK (nitrogen, phosphorus, potassium).

Both emulsifiers are supplied as amber-colored, free-flowing liquids having a mild odor. Sp gr of both is 1.01, and pH of 3% dispersions is 6.5.

In making formulations, the two emulsifiers are usually mixed, the specific ratio of the two depends upon the specific pesticide, fertilizer, and solvent. A number of formulations have been worked out.

(Emcol H-A and Emcol H-B are products of Emulsol Chemical Corp., a Div. of Witco Chemical Co., Dept. CP, 59 E. Madison St., Chicago 3, Ill. . . or for more information check 6366 on form opposite last page.)



we "hand-pick"
our circulation

... CHEMICAL PROCESSING is not sold "at random."

A letter from the Editors in this issue explains how key men in chemical processing are selected to receive CP regularly . . .

... see page 118.

MATERIALS

Release isocyanates when decomposed at 150-200°C...

dimethylamine is also formed
as compounds break down

Uses: As chain terminators in high temperature polymerizations where corresponding isocyanate might react with initiator or active terminal groups present. Can be used where elevated-temperature generation of an isocyanate and dimethylamine is desired.

Features: Compounds form useful decomposition products at 150-200°C. These products are dimethylamine and an isocyanate.

Description: Two substituted urea compounds offered are: *p*-chlorophenyl-1, 1-dimethylurea (SU-101), and 3,4-dichlorophenyl-1, 1-dimethylurea (SU-102). They are relatively inert solids at room temperatures. Suggested polymers are urea-formaldehyde, melamine, and phenol-formaldehyde.

(SU-101 and SU-102 are products of Grasselli Chemicals Dept., E.I. du Pont de Nemours & Co. (Inc.), Dept. CP, Wilmington 98, Del. . . or for more information check 6367 on form opposite last page.)



"Another head cold, Sam?"

Thanks to LeRoy Althouse, Resins and
Plastics Dept., Shell Development Co.

For more information on product at right, specify 6368
... see information request blank opposite last page.



Here's why we call it "The World's Finest FUMARIC ACID"



Made in our new Moundsville, W. Va. plant by an exclusive direct catalytic-oxidation process developed by National Aniline Research, National FUMARIC ACID provides the ideal combination of chemical and physical properties for better polyesters, ink resins, alkyds, drying oils, plasticizers and pharmaceuticals.

Chemically, National Fumaric Acid is 99.6% pure with ash 0.02 maximum. Physically, it is pure white, free-flowing (100% thru 20 mesh) and practically dust-free (5% maximum thru 100 mesh). In every respect, it is a consistently high-quality product.

For customer convenience and economy, we now offer mixed carload or mixed truckload shipments of National Fumaric Acid with Maleic Anhydride, Phthalic Anhydride and Adipic Acid from plant stocks at Moundsville, W. Va. and Buffalo, N. Y. We will be pleased to quote and send samples for work that may lead to greater use of these chemicals.



NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Charlotte Chicago San Francisco Atlanta
Portland, Ore. Greensboro Philadelphia Richmond Cleveland
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto



Where can you use these high-purity chemicals?

| | |
|------------------------|----------------------|
| Ammonium Paratungstate | Phosphotungstic Acid |
| Barium Carbonate | Potassium Silicate |
| Calcium Carbonate | Silicon |
| Germanium | Sodium Sulphate |
| Germanium Dioxide | Sodium Tungstate |
| Molybdenum | Strontium Carbonate |
| Phosphors, | Tungstate Acid |
| (TV tube, | Tungstic Acid |
| CR tube, lamp) | Tungstic Oxide |

Write for technical information

SYLVANIA ELECTRIC PRODUCTS INC.
1740 Broadway, New York 19, N. Y.

In Canada: Sylvania Electric (Canada) Ltd.
University Tower Bldg., St. Catherine St., Montreal, P. Q.

SYLVANIA

When inquiring check 6369 opposite last page

The Smart Trend in

PVA EXTENDERS/

Tamms GOLD BOND SILICA

A functional extender pigment especially adapted to PVA formulation for scrubability, leveling and flat sheen. It is easily wetted and dispersible. pH of 6.5-6.8. Non-crystalline structure. Economical in cost.

TAMMS INDUSTRIES, INC.

When inquiring check 6370 opposite last page

materials

TABLE 1
Clear Film Studies

| Material | Min. to Dry Tackfree | Hot Water Resistance | | Cold Water (24 hrs.) | 5% NaOH (Failure, hours) | Sward Hardness | | |
|--------------------|----------------------|----------------------|----------|----------------------|--------------------------|----------------|-------|-------|
| | | Haze (minutes) | Recovery | | | 1 day | 1 wk. | 1 mo. |
| Keltrol 1001 | 30 | 6 | OK | clear | 3 | 29 | 34 | 39 |
| Keltrol 1013 | 15 | 14 | OK | clear | 4-1/2 | 26 | 33 | 40 |
| Styrenated Alkyd A | 40 | 6 | OK | clear | 1 | 22 | 27 | 43 |
| Styrenated Alkyd B | 10 | 6 | OK | clear | 4-1/2 | 25 | 29 | 43 |
| Medium Oil Alkyd C | 6 hr | 6 | OK | clear | 3 | 20 | 31 | 35 |
| Long Oil Alkyd D | 8 hr | 18 | OK | clear | 1/2 | 4 | 10 | 16 |

Films dry quickly — are hard, yet flexible

coatings are formulated with vegetable oil copolymer

Uses: As vehicles for air- or bake-dry industrial enamels, hammer, polychromatic, and floor finishes. Other uses should be found in paper coatings and label varnishes. It will also be used in special primers and caulking compounds.

Features: Dried films of products have excellent hardness and high gloss. Vehicles dry rapidly, primarily by solvent evaporation, and consequently their films attain maximum hardness soon after they are dry. General characteristics (see Table I) are similar to styrenated alkyds, but their films are somewhat more flexible. The Keltrols have a wide range of solvent compatibility which permits use of low-cost, low-solvency thinners.

Caulking compounds with excellent water, alkali, and mildew resistance have been made with Keltrol 1013. Properly formulated, compounds do not sag or slump and have excellent adhesion. It permits formulations that will set in five minutes, yet remain flexible.

Description: Keltrol 1001 and Keltrol 1013 are

vinyltoluene-vegetable oil copolymers. To meet the needs of many types of protective coatings, Keltrol 1001 comes thinned in mineral spirits; Keltrol 1013 in xylol. Typical analyses are shown in Table II.

Solvent and mar resistance of these vehicles is more than adequate for non-critical applications and permits recoating within four to six hours without difficulty. Compatibility with alkyds and varnishes should be checked before blending.

Recommended drier level is 0.03% cobalt, based on copolymer solids. At this level, Keltrol 1013 films dry tackfree in air in fifteen minutes; and Keltrol 1001 films, in half an hour. Two suggested formulations for low bake industrial white enamels are given in Table III. These films have excellent hardness, gloss and gloss retention. When sprayed on tin panels and baked for 10, 20, and 30 minutes at 250°F and then aged at room temp for 24 hr, they did not fail when the panels were bent over a 1/8" mandrel.

TABLE II
Typical Analysis

| | Keltrol 1001 | Keltrol 1013 |
|-----------------------------|-----------------|--------------|
| Solvent | Mineral spirits | Xylol |
| Nonvolatile (%) | 60 ± 1 | 60 ± 1 |
| Viscosity (Gardner-Holdt) | Y | Z |
| Color (Gardner 1933) | 5 | 5 |
| Acid value | 2.9 | 3.3 |
| Specific gravity (60°/60°F) | 0.905 | 0.948 |
| Weight/gal | 7.54 | 7.89 |

with vinyltoluene—
ner vehicles

(Vinyltoluene-vegetable oil copolymer vehicles are products of Spencer Kellogg and Sons, Inc., Dept. CP, 98 Delaware Ave., Buffalo 5, N.Y. . . . or for more information check 6371 on form located opposite last page.)

TABLE III
Suggested Formulations

| 157P-253 Low Bake — Normal Solvent Industrial White Enamel | | | 157P-267 Low Bake — Rapid Cure Industrial White Enamel | | |
|--|-------|--------|--|-------|--------|
| | Lb | Gal | | Lb | Gal |
| Roller mill paste: | | | Roller mill paste: | | |
| Rutile TiO ₂ | 250 | 7.15 | Rutile TiO ₂ | 250 | 7.15 |
| Keltrol 1001 | 180 | 23.70 | Keltrol 1013 | 180 | 22.80 |
| Letdowns: | | | Letdowns: | | |
| Keltrol 1001 | 385 | 50.60 | Keltrol 1013 | 405 | 51.30 |
| Mineral spirits | 120 | 18.40 | Xylol | 135 | 18.80 |
| 6% Cobalt naphthenate | 1.5 | 0.18 | 6% Cobalt naphthenate | 1.5 | 0.18 |
| | 936.5 | 100.03 | | 971.5 | 100.23 |
| Baking schedule: 20 min @ 250°F | | | Baking schedule: 10 min @ 250°F | | |

OH F

There's a completely
new answer in filtrations
involving caustics or
fluorides...

GLC *Nerofil*®

The new processed carbon-based filteraid

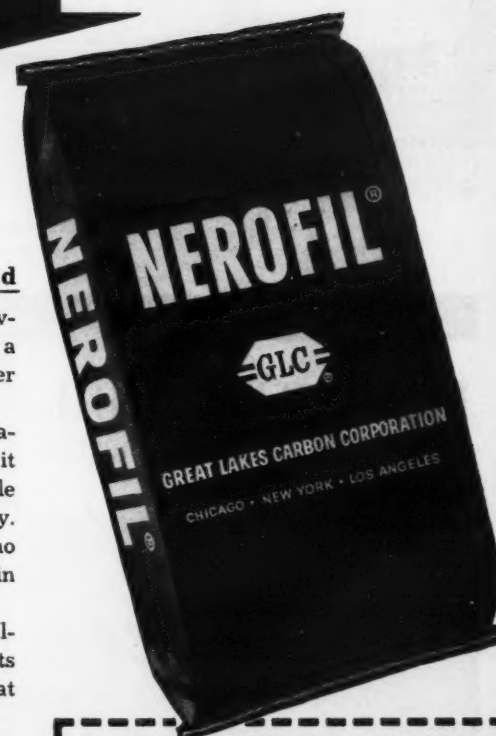
NEROFIL was developed primarily for filtrations involving strongly alkaline solutions where diatomite is at a disadvantage, due to silica solubility, and where no other filteraids have proved entirely satisfactory.

NEROFIL is processed from selected carbonaceous materials. Due to low cake density and high cake porosity, it is a highly effective filteraid, with flowrates comparable to many grades of diatomite and excellent filtrate clarity. Since the filter cake is combustible, disposal presents no problem. Metals values recovery is thus made easy in the filtration of metallurgical solutions.

NEROFIL is both physically and chemically stable. Boiling 50% caustic has negligible effect on NEROFIL . . . tests show no silica solubility in 50% sodium hydroxide at 125°F. in a 30-minute period.

This new filteraid is proving highly successful in caustic and sulfur production, in textile mereerizing, processing involving ligno-sulfonates, and in filtering plating solutions. For more information, send in the coupon, at right, today!

GREAT LAKES CARBON CORPORATION
NEROFIL DEPT. — 612 So. Flower St., Los Angeles 17, Calif.
Dept. LTK — 333 No. Michigan Ave., Chicago 1, Ill.

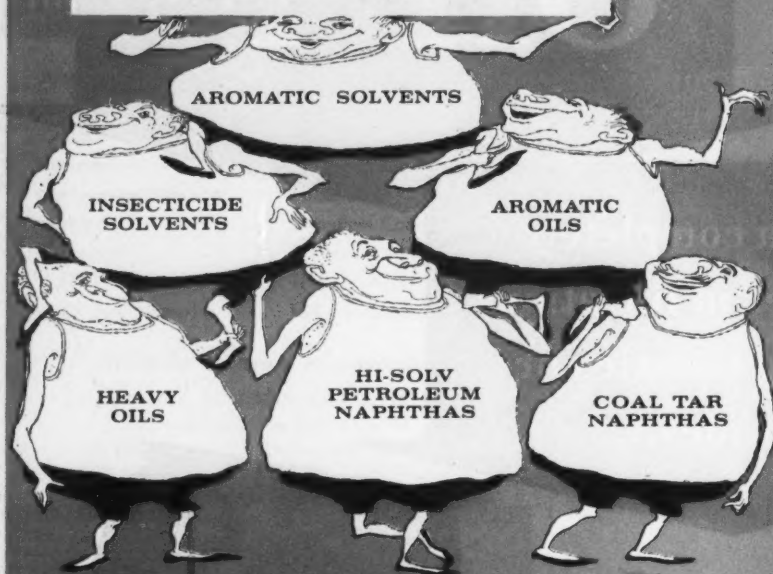


NEROFIL DEPARTMENT,
GREAT LAKES CARBON CORPORATION
612 So. Flower St., Los Angeles 17, Calif.

Name _____
Position _____
Company _____
City _____ Zone _____
State _____

When inquiring check 6372 opposite last page

PICCO SOLVENTS AND SOLVENTS OILS



*Each Picco Solvent
is carefully fractionated
to close specifications*

Picco aromatic petroleum naphthas, coal tar aromatic solvents and solvent oils cover a complete range from low to high boiling solvents and a useful series of non-drying solvent oils. They have been developed to meet the requirements of various diversified industries.



Pennsylvania Industrial Chemical Corp.

Clairton, Pennsylvania

Plants at:

Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

Sales Offices:

Boston, New York, Detroit, Chicago, Cincinnati,
Los Angeles, Philadelphia, Pittsburgh

When inquiring check 6373 opposite last page

MATERIALS

**Excellent adhesion to glass,
metals, or ceramics given
by epoxy insulation . . .**

material combines dielectric properties with good flexibility

Uses: Electronic insulation applications requiring a semi-rigid, low modulus material that will offer high electrical resistance throughout temperature range of -65 to $+300^{\circ}\text{F}$.

Features: Semi-rigid epoxy combines good flexibility with outstanding properties as a dielectric material. Adhesion to metals, ceramics, and glass is excellent. As an insulation medium it has low strain-inducing characteristics.

Description: Epoxy is offered as a two-component, clear impregnant, and as a two-component filled potting and encapsulating medium. Pot life is three to four days at 80°F . Cure time is six hr at 200°F or three hr at 250°F .

| | |
|---|----------------------|
| Dielectric constant | 3.4 |
| Loss factor (at 110 kc) | 0.017 |
| Loss factor (at 1.0 mc) | 0.027 |
| Loss factor (at 11.0 mc) | 0.038 |
| Volume resistivity (ohm-cm at 300°F) | 1.1×10^{10} |
| Elongation (Tensile, %) | 135 |

(Epocast 15 is a product of Furane Plastics Inc., Dept. CP, 4516 Brazil St., Los Angeles, Calif. . . or check 6376 on form opposite last page.)

J. E. SIRRINE CO.
GREENVILLE • SOUTH CAROLINA

Engineers
ESTABLISHED 1902



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When inquiring check 6374 opposite last page

NEW POCKET CALCULATOR For Liquid Batch Mixing

**CAPACI-DIAL for
PNEUMIX
AGITATORS**

Simply turn the pointer to the particular volume and consistency of your batch. The selector automatically tells the best size Pneumix Agitator to do your mixing.



The attached
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without
obligation.

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Company

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"COME NOW JOHNSON, DON'T TELL ME THAT
THIS LITTLE PAPER BAG SCARED YOU!"

This comical chemical processing incident by Tom Sarvey of Diamond Alkali's Research Center.

**Gives improvement over soya glues
in bonding plywood . . .**

blood-soya glue increases strength by 10%

Uses: Developed for gluing plywood.

Features: Plywoods glued with this product have greater water resistance. An interior grade panel made with blood-soya glue is about equal to an exterior grade panel made with resinous glue. Strength is increased about 10% and flexibility is also bettered. The glue resists fungal and bacterial attack. These advantages outweigh its slightly higher cost over straight soya glue.

Description: Called Dion 410®, glue is a proteinous blood-soya product.

(Blood-soya glue is a product of Chemical Process Co., Dept. CP, 58 Sutter St., San Francisco, Calif. . . . or for more information check 6377 on form opposite last page.)

**Chemistry and physics up-to-date
with 37th edition of handbook**

This well-known handbook has become the classic reference work in the combined fields of chemistry, physics, and mathematics. The book is divided into five sections, mathematical tables, properties and physical constants, general chemical tables, heat and hygrometry, and quantities and units. New data have been added in sections on oxidation potentials, dissociation constants of aq. ammonia, viscosity conversion, dipole moments, crystal ionic radii of the elements, and many other subjects.

This edition has 3156 pages, to which 173 collaborators have contributed. Thickness of the handbook has been held at 2½ inches by the use of India paper. Type is clear and easy to read.

To obtain "Handbook of Chemistry and Physics, 37th Edition" remit \$12 direct to The Chemical Rubber Co., Dept. CP, 2310 Superior Ave., Cleveland 14, Ohio. When inquiring specify 6378 on form opposite last page.

**Starts quarterly review
of chemicals and uses**

A quarterly news magazine that discusses business trends, new products, company personnel changes, and new product uses has been started. Initial issues contain eight pages, numerous illustrations. Called *Chemical Review*, subscriptions are available from Chemical Division, The Goodyear Tire and Rubber Co., Dept. CP, 1144 East Market St., Akron 16, Ohio. When inquiring check 6379 on form opposite last page.

BLOCKSON manufactures

SODIUM PHOSPHATES

BUT sells SERVICE

THERE is a reason for the very substantial tonnage of sodium phosphates Blockson ships to industrial areas far from our greatly expanded plant facilities here in Joliet. That reason is continuous prompt shipment—a few bags or many carloads—minus the red tape usually associated with an operation as large as ours.

Again and again customers tell us they couldn't get better service if our plant were located in their own industrial community.

There is a reason for that, too. At Blockson, production and sales are so closely coordinated that a single collect phone call is all that is required to expedite your unforeseen needs and get your sodium phosphates en route the very same day if it is humanly possible, and most frequently it is.

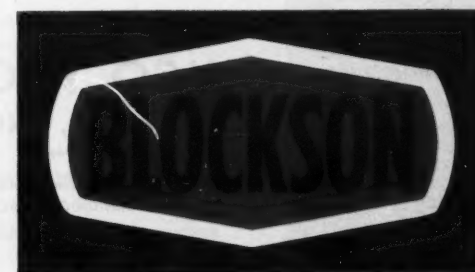
We welcome the responsibility of functioning as an arm of our customers' production setup, minimizing their inventory and warehousing expense, timing and dovetailing dependable shipments with their own processing operations and at all times providing a uniform and dependable competitively priced product—readily available in your required granulations and specifications.

The new Blockson catalog and handbook is yours for the asking.

BLOCKSON CHEMICAL COMPANY

Division of Olin Mathieson Chemical Corporation
Joliet, Illinois

- Sodium Tripolyphosphate
- Trisodium Phosphate
CRYSTALLINE • MONOHYDRATE
- Tetrasodium Pyrophosphate
ANHYDROUS
- Sodium Polyphos
(SODIUM HEXAMETAPHOSPHATE)
(SODIUM TETRAPHOSPHATE)
- Sodium Acid Pyrophosphate
- Trisodium Phosphate Chlorinated
- Disodium Phosphate
ANHYDROUS • CRYSTALLINE
- Monosodium Phosphate
ANHYDROUS • MONOHYDRATE
- Sulfuric Acid
- Sodium Fluoride
- Sodium Silicofluoride
- Hygrade Fertilizer
- Teox 120
NONIONIC SURFACTANT



When inquiring check 6380 opposite last page

ACRAWAX C

SYNTHETIC WAX NOW HAS

lighter color
improved
heat stability

As an exceptionally high melting point wax (140-143°C) with excellent water, acid and salt spray resistance and good electrical properties, Acrawax C has been greatly valued as an anti-block and anti-tack agent, lubricant and coating additive in many industries.

Now, many users will be pleased to learn that the color characteristics and heat stability of the material have been improved, extending its use to applications where lightness of color is particularly important.

Send for your copy of the brochure "Synthetic Waxes by Glyco," and for samples of the light colored, heat stabilized Acrawax C.

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CO., INC.

Dept. C

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NONIONIC SURFACTANTS

SYNTHETIC WAXES • SEQUESTERING AGENTS

When inquiring check 6381 opposite last page

MATERIALS

**Improves pigment suspension,
imparts thixotropy
in oil paints . . .**

greatest efficiency when processed at 130 to 180°F

Uses: For forming thixotropic gel structures in paints, especially those made in equipment developing high temperatures.

Features: Agent imparts sag resistance, better brushability, improved pigment suspension, controlled penetration, and thixotropic body. Product does not grain, seed, or undergo any unfavorable change at elevated processing or storage temperatures and is effective in both aliphatic and aromatic solvent systems. It is non-yellowing.

Description: Agent is a modified vegetable oil derivative and is supplied as a cream colored paste. Requiring no special solvents for activation, it is easily incorporated by grinding with pigment or filler portion of paint or by master-batching with a portion of paint solvent.

Greatest efficiency is attained when grinding is maintained at 130 to 180°F. Agent does not affect durability, resistance, and other properties of the paint finish.

(M-P-A is a product of Baker Castor Oil Co., Dept. CP, 120 Broadway, New York 5, N.Y. . . . or for more information check 6382 on the convenient Reader Service slip which is located opposite last page.)

Bromine's "new look"

A number of syntheses where bromine gives higher yields and offers processing advantages are described in four-page folder. Low bulk prices are reported.

"Take a New Look at Bromine" is issued by Michigan Chemical Corp., Dept. CP, 516 Bankson St., St. Louis, Mich. When inquiring check 6383 on the convenient Reader Service slip opposite last page.

VMP NAPHTHAS

18c or 2c

If you evaporate VMP Naphthas in your process, you're paying around 18c per gallon for this solvent. Others using VMP Naphthas, however, are re-using them again and again for only 2c per gallon. The difference is a Barnebey-Cheney Automatic Solvent Recovery system, which can recapture VMP Naphthas from an air stream at the low operating cost of 2c per gallon. This savings potential can quickly amortize your investment in a recovery system. Write today for complete details. Send for the free bulletin: "Solvent Recovery Actually Takes Dollars out of the Air."

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When inquiring check 6384 opposite last page

CONTROL THAT

Bad odors are objectionable and—in many ways—costly. We have specialized in the chemical control of offensive industrial odors for many years. If confronted with any type of odor problem, consult with our experts for an economical solution. Write us in detail.

DOR

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BRANCH OFFICES and *STOCKS: Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cincinnati, O., Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N.J.

When inquiring check 6385 opposite last page

CHEMICAL PROCESSING

Here's how to make lithium metal dispersions

Interest sparked by discovery that they make unique polymerization catalysts

Lithium metal dispersions are receiving more and more attention since the discovery that they are unique polymerization catalysts. Here in brief is the way to make lab-scale dispersions.

Apparatus is simple. A resin reaction flask with stainless steel bottom and Pyrex brand glass top is equipped with a stainless steel dial thermometer, high-speed stirrer, air condenser, gas inlet and outlet tubes, and a heating unit. The container portion must *not* be of glass, because lithium reacts vigorously with most glasses.

Procedure. Flush apparatus with argon or helium and charge with dispersing medium (mineral oil, petrolatum, or wax). Heat to melt, if necessary, then add measured amount of lithium. This amount can be up to 40% (wt). Heat above 179°C to melt the lithium, and add dispersing and stabilizing agents (oleic acid will serve as both). Disperse at 200-210°C. Cool dispersion and pour into metal container, previously swept with inert gas.

Dispersing medium should boil higher than 200°C, preferably 220°C. Aromatic media should be used with caution because there is some evidence of decomposition. Liquid media are fluid at room temp, but dispersions may settle out on standing. Solid media prevent separation, can be used without dispersing or stabilizing agents.

Safety precautions, similar to those taken in handling alkali metals, must be observed. Avoid contact with water or moist air. When handling the dispersions, use goggles, gloves, and aprons. Blanket any fires with graphite powder, pyrene G-1, or anhydrous LiCl, and then remove to a safe area for burning. Lab apparatus can be cleaned with a 15% soln. of isopropanol in kerosene; larger units, by burning or treating with dry steam.

(Information on lithium dispersions is courtesy of Lithium Corporation of America, Inc., Dept. CP, Rand Tower, Minneapolis 2, Minn. . . or for more information check 6386 opp. last page.)

Adhesives for plastics and metals

Fold-out chart gives data about 30 adhesives for industrial bonding of plastics, metal, wood, paper.

"Bondmaster Data Chart" is issued by Rubber & Asbestos Corp., Dept. CP, 225 Belleville Ave., Bloomfield, N.J. Specify 6387 opposite last page.

BRIEFS

for buyers of

Caustic Soda Aluminum Chloride Sulfur Chlorides

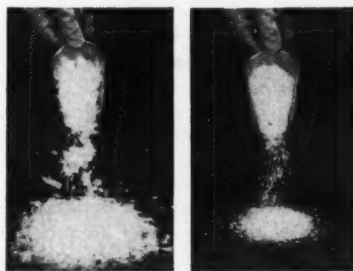
He treats our caustic drums

rough. A customer in the Pennsylvania oil fields made our salesman wince.

Said he likes our flake caustic soda drums, because they make it easy to distribute caustic in the field. He just shoves the drums off the tailgate of his truck, lets them bounce. He's been doing it for some time without handling losses.

We certainly don't advise this procedure, but it does provide a dramatic testimonial. Six lugs grip the lid of every drum of Hooker flake caustic soda—the best way we've found to keep the caustic dry and pure for your processing or repackaging.

The drum comes to you full of clean, uniform flakes—regular, fine, or crystal—or powdered caustic. The picture below demonstrates how dust-free the flakes are. The coupon offers a helpful booklet on buying caustic soda.



Why we air-condition our aluminum chloride. Even slightly humid air reacts swiftly with aluminum chloride. When it does, the crys-

tals of this sensitive chemical lose their shape, and most of their punch as catalysts.

We avoid such damage to our aluminum chloride by using a special packaging room that is air-conditioned. It gives us complete control over humidity. Regardless of outside weather conditions, we can package aluminum chloride all year 'round.

To you the room means a continuous, dependable supply of full-strength aluminum chloride. And you always get the size you want for your process.



Speaking of size, you have a choice of four from Hooker—extra fine, fine and coarse grinds, and coarse screened. Send the coupon for a data sheet that gives complete specifications on all four or write today on your business letterhead.

How to dry paint in 2 seconds.

Many paints, inks, and varnishes take from 24 hours to a week to dry thoroughly.

But pass them through sulfur dichloride vapor, and they dry before

your eyes—in from 2 to 20 seconds. This drying process works on paper, wood, cloth, metal, glass, plastics.

Maybe there's a place for super-fast drying in your company. If you think so, write us for the name of the process licensor.

Perhaps you're already using SCl_2 in a less glamorous but equally useful way. Whatever the need, you can answer it by specifying Hooker sulfur dichloride.

And if it's chlorination you're doing, you might be happy, to know we also make its versatile chemical cousins, sulfur monochloride, sulfuryl chloride, and thionyl chloride.

Sources we've checked indicate we're the only producers of all four of these chlorides. We'll be happy to provide (a) data sheets on any of them, if you'll check the coupon; (b) samples, if you'll just write on your letterhead outlining your needs.

Check items you'd like to receive:

- ☐ **Caustic Soda Buyer's Guide** • A helpful pocket-size booklet full of information and pictures on forms and sizes; shipping methods and containers; the economics of 50% vs. 73% solutions (with nomograph to help decide which is your best buy); and technical service.

Keep your file up-to-date with technical data sheets on these Hooker chemicals:

- ☐ Aluminum chloride
- ☐ Caustic soda (standard grade)
- ☐ Caustic soda (rayon grade)
- ☐ Sulfur dichloride
- ☐ Sulfur monochloride
- ☐ Sulfuryl chloride
- ☐ Thionyl chloride

Clip and mail with your name, title, and address.

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PLASTICS

HOOKER ELECTROCHEMICAL COMPANY

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When inquiring check 6388 opposite last page

PROOF

of versatility of EMPOL® 1022 Polymerized Fatty Acid



More than 80 Use-Patents Already Issued to U.S. Companies!

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This liquid, high molecular weight (C_{36}), dibasic acid still offers unlimited opportunities for the development of new, exciting end-products. Its dibasic structure, high molecular weight (C_{36}), excellent heat-stability, and high viscosity make it ideal for polyesters, esters, polyamides, soaps and other derivatives in such applications as adhesives, coatings, petroleum products, surfactants, resins and rubbers.

Why not investigate Empol 1022 and see how it can lead to profit-making end-products for you? Mail coupon below for literature or write for evaluation samples.



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Emery Industries, Inc., Dept. CP-7
Carow Tower, Cincinnati 2, Ohio

Please send complete information on Empol
1022 Polymerized Fatty Acid.

Name.....Title.....
Company.....
Address.....
City.....State.....

MATERIALS

**Paste form of Hansa yellow G
made by transferring pigment
from water to oil by flushing...**

final shade is clean, has 35% greater strength;
gloss in final film is very high

Uses: As a yellow pigment in formulation of industrial and trade sales finishes. Pigment can be blended with phthalocyanine blue for permanent alkyd resistant greens of clean shades for toy enamels, lead-free paints, and trim paints.

Features: Cleanliness of final shade and unusually high gloss in final films are exceeded only by the strength factor, which measures 35% greater. The highly brilliant pigment has excellent lightfastness (full strength) and alkali resistance.

Description: Product is first commercial offering of Hansa yellow G in paste form. It is produced by transferring the pigment from the aqueous pulp to an oil phase through the medium of pigment flushing. Pigment is an organic azo compound produced by coupling *m*-nitro-*p*-toluidine and aceto acetanilide.

Pigment is flushed in a medium-short pure glycerol phthalate soya-modified alkyd resin and reduced with mineral spirits. Final product has 40% color, 33% resin, 27% solvent, and weighs 8.92 lb/gal.

(Flushed Hansa yellow G (Code No. 5-42-A-215) is a product of Hilton-Davis Chemical Co., Div. of Sterling Drug Co., Dept. CP, 2235 Langdon Farm Rd., Cincinnati 13, Ohio... or for more information check 6390 on form opposite last page.)

**High solids — low viscosity
with acrylic copolymer
emulsion...**

its alkali salts thicken emulsion paints, natural or synthetic latices

Uses: The sodium, potassium, and ammonium salts of this copolymer are efficient thickeners for emulsion paints, natural or synthetic latices, adhesives, and other aqueous suspensions. Salts of the compound are expected to be used as temporary binders in ceramics, dispersing or suspending agents for pigments or abrasives, and drilling-fluid additives.

Features: Advantages of high solids and low viscosity (as supplied), combined with the typical properties of water-soluble polymers, make emulsion attractive. Material is substantially lower in solids cost.

Films formed from the emulsion can be redissolved in alkali. They also show ability to bind pigments to be insolubilized by ionic reactions.

Description: The acrylic copolymer emulsion

ELEMENTAL BORON

in commercial quantities

**manufactured
to meet your
specific needs!**

Today's elemental boron, no longer a laboratory curiosity, is a fast-growing chemical with important commercial aspects. For those working in Boron Chemistry, Trona* now offers several grades of elemental boron to meet your specific needs. Trona, a world leader in the development of commercial boron, has the technical know-how and production facilities to fill your orders in any quantity without delay.

CURRENT FIELDS OF APPLICATION:

In the Military, elemental boron is being used in Ordnance applications for flares, fuses, ignitors, and propellant mixtures. Commercially, it is used in borides for high temperature applications, and with plastics for lightweight neutron shields.

To get more information about Trona's special grades of elemental boron, call your Trona technical representative today.

TRONA

Contact Sales Development Department

**American Potash &
Chemical Corporation**

3030 W. Sixth St. 99 Park Avenue
Los Angeles 54 New York 16
DUNKIN 2-8231 OXFORD 7-0544

*TRADE MARK AP&C

When inquiring check 6391
opposite last page

CHEMICAL PROCESSING

When inquiring check 6389 opposite last page

MATERIALS

can be converted to a clear, viscous solution by addition of a base. Typical physical properties are:

| | |
|---------------------------------------|------------|
| Solids (%) | 40.0 ± 0.5 |
| pH (when packed, approx.) | 3.0 |
| Viscosity Brookfield, cps (@ 25°C) | 20 |
| Sp gr (@ 25°C) | 1.08 |
| Colloidal charge | negative |
| Appearance of liquid | milky |

(Acrysol ASE-75 is a product of Resinous Products Div., Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . . or for more information reader may simply check 6392 on form opposite last page.)

SHARE THE GAG!



Has it ever struck you that there are moments when chemical processing becomes comical processing? Next time something funny happens in the plant or lab, why not share the laugh with CHEMICAL PROCESSING readers?

If you can draw, send your cartoon in black ink on an 8½ x 11" sheet, ready to reproduce. We'll pay you \$10 if it is accepted.

If you have a cartoon idea you can't draw, send in a description or rough sketch of the scene, and the caption. We'll send you \$5 on acceptance.

Send your cartoon or idea to:

Cartoon Editor
CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.

We fit our production to YOUR needs



Our specialty is making white oils, petrolatums and petroleum sulfonates to fit specific needs. Since we've been doing this for more than half a century, we know how to make these products exactly the way our customers want them.

Chances are, there's a white oil, a petrolatum or a petroleum sulfonate among the many types and grades in our regular line that will be just right for your purpose. But if there isn't, we'll tailor-make one for you.

No matter what your problem may be, you may be sure we shall fit our production to your needs!

L. SONNEBORN SONS, INC.
New York 10, N. Y.

A Product of **Sonneborn** RESEARCH

White Oil, Petrolatum & Sulfonate Div.
L. SONNEBORN SONS, INC., Dept. CP7
300 Fourth Avenue, New York 10, N. Y.

Gentlemen:

Will you please send me Technical Data on the following:

☐ White Mineral Oils ☐ Petrolatums ☐ Petroleum Sulfonates
What can you do to help me solve this problem?

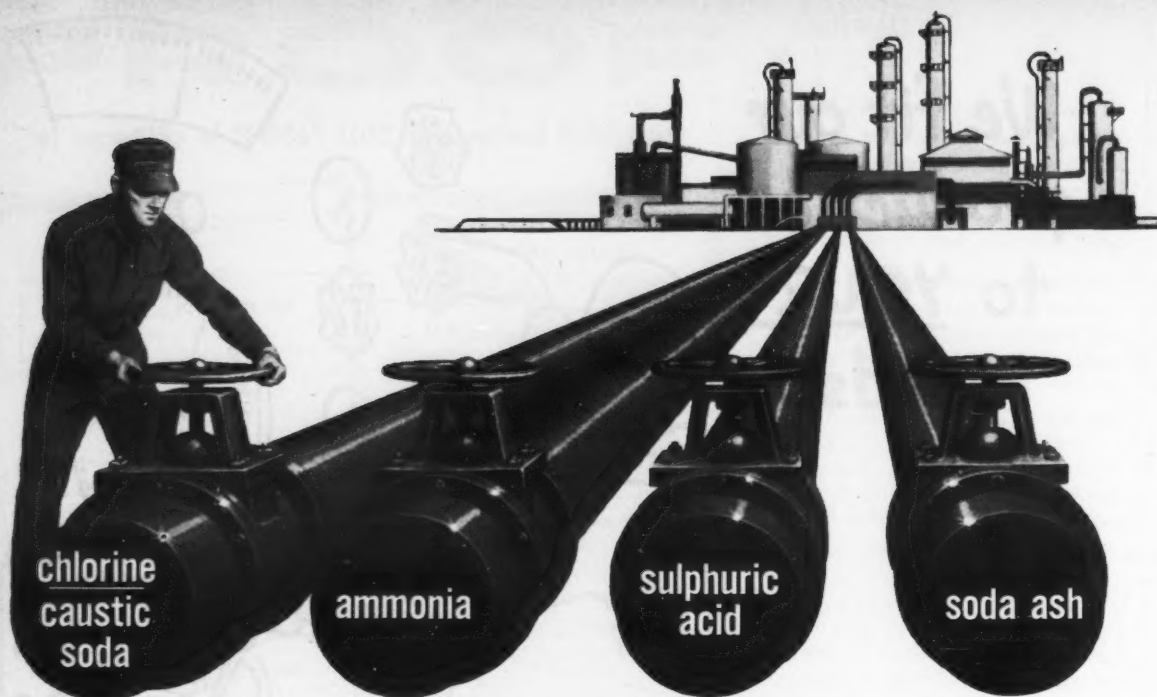
Name.....

Company.....

Address.....

City.....Zone.....State.....

When inquiring check 6393 opposite last page



you can be on our "pipe line"

Want to smooth out your chemical supply problems? Tap into the Olin Mathieson "pipe lines." You'll see what our multi-plant production facilities can mean to you.

The effect of a number of producing points is to balance out local shortages and surpluses. In one instance, a serious chlorine shortage on the Gulf of Mexico was relieved by an excess in Canada. Each of the five plants between shipped into the next plant supply area to the South, setting up a chain reaction which released the needed tonnage on the Gulf.

Our combination of multi-plant facilities and an imaginative approach to the logistics of the chemical industry can prove invaluable to you. Discuss it now with an Olin Mathieson representative or write the Chemicals Executive Office in Baltimore.



MATHIESON CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

INORGANIC CHEMICALS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Potash • Caustic Soda • Chlorine • Hydrazine and Derivatives • Hypochlorite Products • Muriatic Acid • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid
ORGANIC CHEMICALS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylene • Formaldehyde • Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorobenzene • Polychlorobenzene • Trichlorophenol

When inquiring check 6394 opposite last page

MATERIALS

Diisocyanate polyester elastomer

COMBINES HIGH TENSILE
WITH ABRASION
AND OIL RESISTANCE



Big use seen in making parts for hydraulic systems

Uses: This synthetic elastomer will find use in making parts for the hydraulics industry, for example, O-rings, V-cups, gaskets, and seals. Other uses will be in making check valve buttons, bellows, molded diaphragms, gears, and metal-reinforced rollers.

Features: Elastomer has unusually high tensile strength and extreme abrasion resistance. It is flame-retardant and has excellent aging properties. It resists oils having less than 90% aromatics. Material has high resistance to ozone and, although sunlight darkens it, properties are not affected. Loss factor at high frequencies is low. Material also resists effects of radioactivity. Parts made from it have good sealing properties.

Description: Disogrin is an interlaced poly addition product taken of both a polyester and a diisocyanate. It is made under license from Mobay Chemical Co., and belongs to the same chemical family as Vulkollan, an elastomer made by Carl Freudenberg, KGaA of Weinheim, Germany.

HIGH TENSILE STRENGTH
WITH ABRASION, AGING,
OIL RESISTANCE



Products made from the elastomer include scraper rings, O-rings, V-cups, coated metal rollers, shoe heels, and sheets

Two basic types are available: for compression-injection molding and for liquid casting. Liquid casting permits lower cost molding of many shapes not possible by the compression method.

At low temperatures, the elastomer hardens without becoming brittle. High temperature applica-

(Please turn to next page)



Abrasion resistance was tested on this unit

Research Chemists: Raymond invites you to explore the unusual properties of our **LAURYL SULFATES***

***PENDIT® WA COSMETIC** (Grade) is the new surface active agent manufactured by Raymond Laboratories, Inc., 20-year specialists in the beauty aids preparation field. The lightest colored sodium lauryl sulfate known, only Raymond guarantees consistent, built-in uniformity.

The properties of **PENDIT WA COSMETIC** are unique: Nowhere else can you get the same viscosity, the same degree of emulsification, and the stability—batch after batch—without detergent variation problems that necessitate constant formula correction. Practically water-white, **PENDIT WA COSMETIC** is essentially iron free and has a low salt content. Neutral and stable, continuing tests demonstrate unvarying results from lot to lot.

The uses for **PENDIT WA COSMETIC** are unlimited: In industrial emulsions; in the textile field for scouring; in the preparation of liquid and paste cream shampoos; in cosmetic suspensions and emulsions; in liquid dishwashing compositions, car washes and personal cleansing products; in short, wherever a mild but effective detergent and a powerful emulsifier are needed. Three viscosity grades are available: LV (low), MV (medium) and HV (high)—all cosmetically

pure, competitively priced, and obtainable in commercial quantities.

Raymond ALSO SUPPLIES THESE NEW LAURYL SULFATES

***PENDIT WA-T** (Triethanolamine lauryl sulfate)
A clear fluid liquid with low cloud point, outstanding color, foaming, detergency and wetting properties for liquid clear shampoos and foaming hand cleaners.

***PENDIT WA-D** (Diethanolamine lauryl sulfate)
A 35% active anionic detergent of pronounced color stability for liquid clear shampoos.

AN INVITATION FROM Raymond

Consider your chemical processes. Can a high foaming, cosmetic grade sodium lauryl sulfate improve efficiency, better the quality, earn extra savings in time and money, or add sales appeal to your product? A new product data booklet on **PENDIT WA COSMETIC** is yours for the asking. Product data sheets are also available on **PENDIT WA-T** and **PENDIT WA-D**. Our technical staff will be glad to supply you with formulas or formula suggestions, as well as working samples, and work with you on your problems. Drop us a line on the coupon below describing your process or idea. There is no obligation.

Describe Your Application, Clip and Mail Today

Raymond LABORATORIES, INC.
267 East Fifth
St. Paul 1, Minnesota

Send complete information on the lauryl sulfates checked below:
☐ **PENDIT WA COSMETIC** ☐ **PENDIT WA-T** ☐ **PENDIT WA-D**
☐ Sample ☐ Sample ☐ Sample
I am interested in the use of **PENDITS** for the following application:

Name _____ Position _____
Firm _____
Address _____
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Industrial chemicals of cosmetic quality

Raymond

laboratories, incorporated

267 East Fifth, St. Paul 1, Minnesota

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When inquiring check 6395 opposite last page



For You Catalyst "Know-How"

What makes one catalyst superior to another? Often it is the unseen ingredient, "know-how". Davison's long experience in successful catalyst production gives you this all-important element.

Davison, the first commercial producer of synthetic petroleum cracking catalysts, operates a modern plant for the sole purpose of producing specialty catalysts to aid industrial chemical progress. These catalysts can be custom made to your specifications. We guard your "know-how" as carefully as we do our own. They are made in many forms including granular, pelleted, powdered, spherical, extruded and include many supports and active agents.

Put Davison's "know-how" to work on your problem. No matter what your catalyst requirements are, it will pay you to discuss them with the Davison Field Service Engineer. A free booklet on Davison dependable catalysts is available on request.

DAVISON CHEMICAL COMPANY

Division of W. R. Grace & Co.
Baltimore 3, Maryland

Sales Offices: Baltimore, Md.; Chicago, Ill.; Columbus, Ohio;
Houston, Texas; New York, N. Y.

Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple
Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides.
Sole Producers of DAVCO® Granulated Fertilizer.

When inquiring check 6396 opposite last page

MATERIALS

Synthetic Elastomer

(Continued from preceding page)

| COMPARATIVE FLUID RESISTANCE | | | | | | |
|--------------------------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|
| Note: Test run 7 days @ 200°F. | | | | | | |
| OIL/FUEL | DISOGRIN | | BUNA-N | | NEOPRENE | |
| | Parameter Change | Volume % Change | Parameter Change | Volume % Change | Parameter Change | Volume % Change |
| DTE Heavy-Med. Oil | -3 | 0 | +7 | -8 | -9 | +2 |
| Pydraul | -56 | +48 | -92 | +73 | -78 | +42 |
| JP-4 | 0 | +3 | -6 | +12 | -20 | +19 |
| Water | -16 | 0 | -3 | +6 | -5 | 0 |
| Mil-O-5606 | -3 | 0 | -6 | +25 | -25 | +32 |

| TYPICAL FLUID RESISTANCE | | |
|-----------------------------------|------------------|-----------------|
| Note: Test run 70 hours @ 68°F. | | |
| OIL/FUEL | DISOGRIN | |
| | Parameter Change | Volume % Change |
| ASTM #1 | 0 | +0.3 |
| ASTM #2 | -5 | +13.0 |
| ASTM #3 | +1 | +5.0 |
| Mobil Arctic Oil | -5 | +0.3 |
| Esso #90 Lube | -13 | +1.1 |
| Mil-L-7808-B | 0 | +1.0 |
| JP-4 | 0 | +2.0 |
| Note: Test run 70 hours @ 300°F. | | |
| ASTM #1 | -35 | -2.0 |
| MIL-L-7808-B | -20 | +3.0 |
| Note: Test run 100 hours @ 212°F. | | |
| ASTM #3 | +5 | +1.0 |

| GENERAL PROPERTIES | | | | | | |
|--|-------|------|-------|-------|-------|-------|
| Note: Approximate Specific Gravity is 1.25 | | | | | | |
| COMPOUND NUMBER | 13 | 15 | 17 | 22 | 23 | 24 |
| Shore Hardness "A" | 80 | 75 | 90 | 85 | 88 | 90 |
| Resilience (%) | 50 | 60 | 33 | 40 | 37 | 37 |
| Tensile (PSI) | 7230 | 5910 | 5470 | 5700 | 6300 | 6900 |
| Elongation (%) | 680 | 750 | 540 | 630 | 690 | 670 |
| Abrasion* | 35 | 31 | 33 | 22 | 26 | 26 |
| Color | Amber | Blue | Amber | Amber | Amber | Amber |

*Buna-N is 65

tions are generally satisfactory, except in presence of steam or hot water above 200°F. Good adhesion to metal is obtained by direct molding or casting on the part. Where necessary, parts made from the elastomer may be reinforced with fabric. Specific properties are given in the tables.

(Disogrin diisocyanate polyester elastomer is a product of Greer Industries Inc., an affiliate of Greer Hydraulics, Inc., Dept. CP, Jamaica 30, N.Y. . . . or for more information about manufacturer's product, reader may simply check 6397 on the convenient Reader Service slip which is located opposite last page.)

**Light-colored nitrile rubber
is oil resistant and has
good physicals . . .**

rubber's antioxidant system is non-staining

Uses: In light-colored applications such as flooring, clear cements, and where resistance to UV-light or photo-chemical degradation is required.

Features: By using an improved antioxidant system, rubber is non-staining and non-discoloring and has good processing characteristics and physical properties, even after aging.

Description: Chemigum N6-B is a light-colored nitrile rubber.

(Nitrile rubber is a product of Chemical Div., Goodyear Tire and Rubber Co., Dept. CP, 1144 E. Market St., Akron 16, Ohio . . . or for more information check 6398 opposite last page.)

**Excellent working properties
and color and light stability
are found in green toner . . .**

pigment won't migrate or bleed in organics

Uses: For pigmenting paints, lacquers, and enamels, as well as printing inks, plastics, synthetic textiles, floor coverings, and roofing granules.

Features: Toner has high strength and excellent color and light stability. It will not migrate or bleed in organics. Working properties are excellent.

Description: Toner is chlorinated copper phthalocyanine. The finely-divided dry powder has a sp gr of 2.24. It bulks 0.0535 gal/lb in displacement in composition formulations.

The tone of the powder is clean, which should increase its use as a blending color with suitable yellows to produce shades of highly-stable greens.

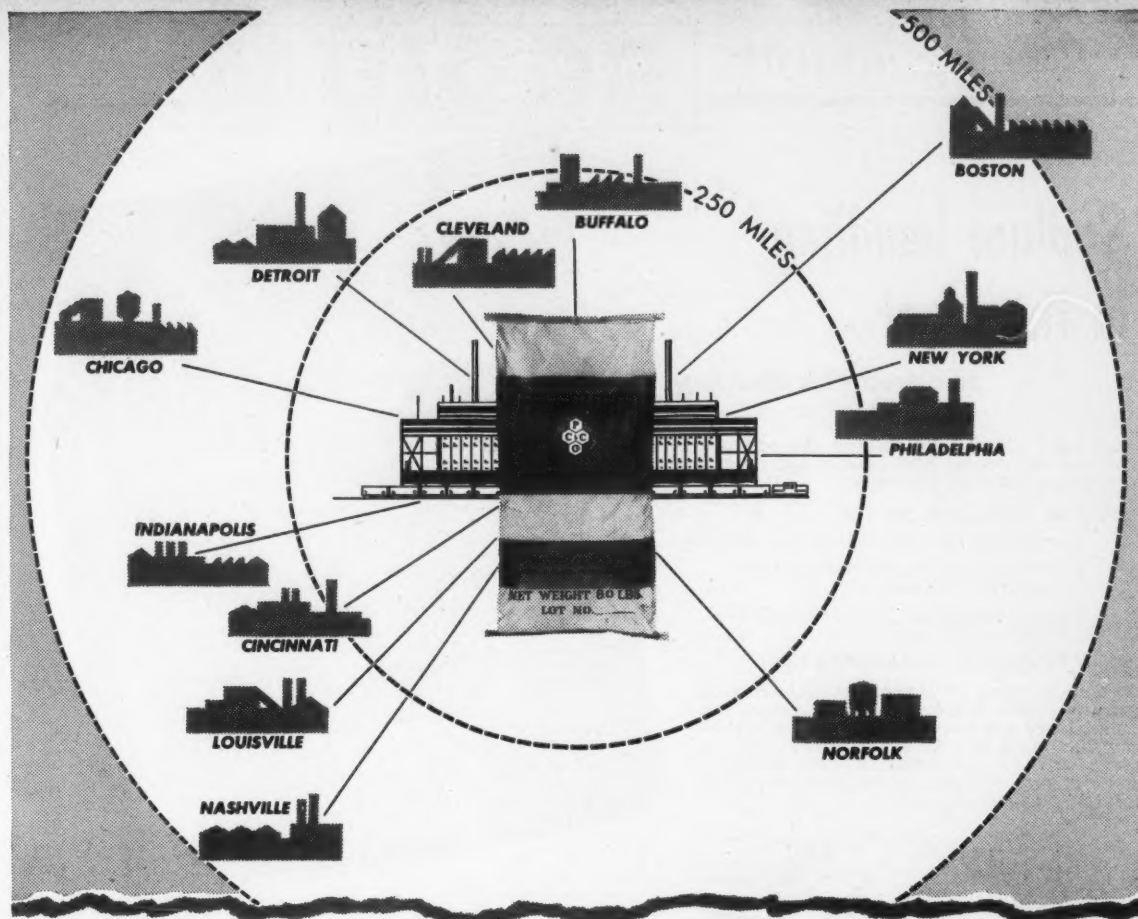
(Cyan Green Toner 15-3100 is a product of Pigments Div., American Cyanamid Co., Dept. CP, 30 E. Rockefeller Plaza, New York 20, N.Y. . . . or check 6399 opposite last page.)

have you been selected?

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magazine regularly?

The Editors tell how key processing men
are chosen to receive CHEMICAL PROC-
ESSING every month.

See page 118.



In Phthalic Anhydride PITTSBURGH is

Basic in Location, too!

If you want faster shipments and better inventory control of your phthalic anhydride, remember this: Pittsburgh is practically dead center on any map of America's great industrial heart area. So whatever your location—near Louisville or Buffalo, Chicago or Boston, you can count on practically 24-hour shipment of flake or molten P.A.—or any of the Pittsburgh Chemicals below—from our Neville Island plant.

And here's another advantage worth considering. In one, completely integrated production cycle, Pittsburgh Coke & Chemical *quality-controls* every step of our basic production from coal to phthalic anhydride. You benefit by maximum P.A. purity, low color value and uniformly low maleic anhydride content. ● We'll be glad to send you samples or technical data and assistance. *Call or write us today.*

| | |
|--------------------|--------------------------------|
| Phthalic Anhydride | Maleic Anhydride |
| Fumaric Acid | |
| Phenol | ortho-Cresol meta, para-Cresol |
| Benzene | Toluene Xylene |
| Pyridine | alpha-Picoline |
| | beta, gamma-Picoline |
| Sulphuric Acid | Ammonium Sulphate |



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keeping up with

SODIUM

Sodium handling in the plant

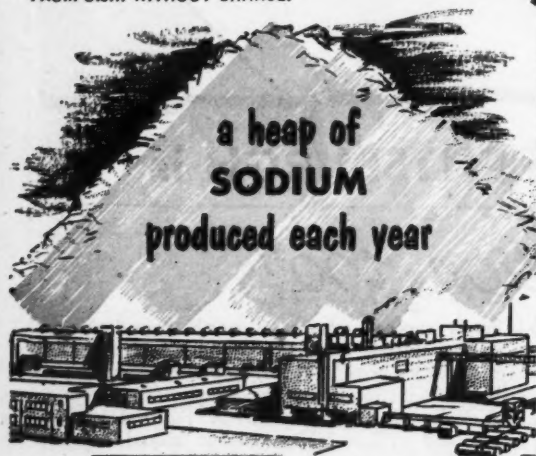
new book describes how

THIS BOOK IS FOR ENGINEERS AND PRODUCTION MEN WORKING IN DESIGN, DEVELOPMENT AND OPERATION OF SODIUM HANDLING EQUIPMENT.

CONTAINS INFORMATION SUCH AS—

- DETAILS OF TYPICAL SODIUM-USING PROCESSES
- DETAILS OF EQUIPMENT INSTALLATION, INSULATION, HEATING, REPAIR
- RECOMMENDATIONS FOR SODIUM PUMPING, METERING, INSTRUMENTATION
- SAFETY IN DESIGN AND OPERATION

FORTY-FOUR PAGES OF DETAILED INFORMATION ON SODIUM HANDLING BASED ON IN-PLANT EXPERIENCE. NO SUBSTITUTE FOR DIRECT U.S.I. TECHNICAL ASSISTANCE, THIS BOOK WILL NEVERTHELESS PROVIDE THE READER WITH A SOLID FOUNDATION IN THE PRINCIPLES AND PRACTICES OF SODIUM ENGINEERING. AVAILABLE FROM U.S.I. WITHOUT CHARGE.



WELL OVER A HUNDRED THOUSAND TONS OF SODIUM ARE USED IN THE UNITED STATES EVERY YEAR. 140 MILLION POUNDS GO INTO TETRAETHYL LEAD; ABOUT 45 MILLION INTO SODIUM CYANIDE; ALMOST AS MUCH INTO FATTY ALCOHOLS; 7 TO 10 MILLION INTO SODIUM PEROXIDE; ABOUT 4 MILLION INTO SODIUM HYDRIDE DESCALING OF STEEL; AND ABOUT 4 MILLION FOR INSECTICIDES, DYES, DRUGS, ALKOXIDE PREPARATION, SPECIALTY CHEMICALS, ATOMIC ENERGY AND A NUMBER OF MISCELLANEOUS USES. AND NOW TITANIUM METAL, "U.S.I. ISOSEBACIC" ACID AND MANY ORGANICS ARE JOINING THE LIST.

U.S.I. TECHNICAL SERVICE HAS BEEN CALLED ON BEFORE OR DURING DESIGN OF ALMOST EVERY NEW SODIUM HANDLING UNIT BUILT DURING THE PAST FEW YEARS. THE SAME SERVICE IS AVAILABLE TO YOU IN ALL PHASES OF YOUR DEVELOPMENT, DESIGN, AND PRODUCTION.



DID YOU KNOW

- THAT MILD STEEL IS SATISFACTORY FOR MOST SODIUM HANDLING EQUIPMENT?
- THAT SODIUM PIPELINES CAN BE CUT AND REWELDED WITHOUT DRAINING?
- THAT SODIUM BRICKS ARE MOLDED IN OPEN AIR?
- THAT MOLTEN SODIUM CAN BE PUMPED AND METERED CONTINUOUSLY?
- THAT THE ATOMIC ENERGY COMMISSION HAS STUDIED OVER 60 CONSTRUCTION MATERIALS FOR SODIUM HANDLING?

RESULTS OF THE A.E.C. STUDIES, ALONG WITH MANY OTHER DETAILS OF SODIUM HANDLING TECHNOLOGY, ARE PRESENTED IN U.S.I.'S NEW BOOK.

ASK FOR NEW U.S.I. SODIUM HANDLING BROCHURE.

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MATERIALS

Promising normal, mixed derivatives from sulfostearic, sulfopalmitic fatty acids . . .

eye uses in detergents, greases, polymerization, lube oils, and chemical intermediates

Uses: Sulfonated fatty acids or their derivatives appear to have a promising future in the fields of detergents, greases, ore flotation, butadiene-styrene polymerization, fuel and lube oils, and as chemical intermediates.

Features: The alpha sulfonic acids contain a strongly ionized sulfonic acid grouping and one carboxyl group. This makes possible a variety of normal and mixed derivatives such as alkali salts, amides, esters, and alkyl ammonium salts. These derivatives contain at least one long hydrocarbon chain to impart surface-active properties to the molecule.

Description: α -Sulfopalmitic acid and α -sulfostearic acids are made by reacting palmitic acid and stearic acid, respectively, with liquid sulfur trioxide in a solvent. Products are grayish powders that are somewhat hygroscopic. In general, they are soluble in polar solvents. The free acids are more soluble than their sodium salts. Physical characteristics are given in the table.

| | α -sulfo- palmitic acid | α -sulfo- stearic acid |
|-----------------------------------|--------------------------------------|-------------------------------------|
| Melting point (°C) | 84-88 | 92-95 |
| Molecular wt | 340 | 365 |
| Sp gr | 0.95 | 0.95 |
| Color (Gardner, 17% aq. soln.) | 6-7 | 14 |

(α -Sulfoalkyl acids are available in pilot plant quantities from Chemical Div., Armour & Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. . . . or check 6402 opposite last page.)



"I think the answer to your problem is a PVC or phenolic liner that can be taken internally."

When inquiring check 6401 opposite last page

MATERIALS

Adds ten organics

Maleo-pimaric acid is a Diels-Alder adduct of one of the resin acid isomers with maleic anhydride. Compounds form a water-soluble sodium salt of high molecular weight.

m-Bromo- α , α , α -trifluorotoluene boils at 154-156°C, has mw of 225.03.

5-Chloro-2-hydroxy-4-methylhexanophenone melts at 53-55°C and has a 240.74 mw.

Di-n-hexyl carbonate boils at 150-153°C at 15 mm pressure. Its mw is 230.35.

1-Ethyl-1-(1-naphthyl)-2-thiourea melts at 158-160°C, has 230.34 mw.

α -Hydroxy-iso-butyric acid has a melting point of 77.5-80°C and a mw of 104.10.

Indoline boils at 106-108°C at 14 mm and has a 119.17 mw.

Methyl 2-bromo-n-butyrate has a 181.04 mw and boils (13 mm) 56-58°C.

5,6,11,12-Tetraphenylnaphthacene has a 532.69 mw.

2,4,7-Trinitro-9-fluorenone melts at 177-178°C, has a 315.21 mw.

(Organic chemicals are products of Distillation Products Industries, a div. of Eastman Kodak Co., Dept. CP, 343 State St., Rochester 3, N.Y. Check 6403 opp. last p.)

Fluorescent and luminous lighting materials

Fluorescent and luminous paints, liquids, inks, fabrics, and paper are listed in this two-page folder. Materials come in five colors. UV lamps are also described.

"Stroblite Products" is issued by Gardner Laboratory Inc., Dept. CP, Bethesda 14, Md. Check 6404 opposite last page.

For more information on product at right, specify 6405 see information request blank opposite last page.



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PARASEPTS®

Here is your solution to the problem of safe and effective preservation of products vulnerable to fungal and bacterial attack. By preventing the growth of such microorganisms, Heyden Parasepts eliminate costly breakdown, resultant malodor and discoloration of your product.

Harmless and non-irritating to the skin, the Parasepts find wide use in creams, lotions and other cosmetics; also in finger paints, tooth pastes and antibiotics where a low level of toxicity is required.

As non-ionic, neutral esters, Parasepts may be used in combination with other preservatives to achieve protection with maximum safety.

You will benefit from these outstanding advantages of the Parasepts:

- Colorless, odorless and tasteless in recommended concentrations.
- Non-irritating to skin; extremely low toxicity.
- Economical—effective in low concentrations.

Heyden offers Methyl, Ethyl, Propyl, and Butyl Parasepts in purified and technical grades to meet your specific requirements.

Write for Bulletin PSPT-1 and detailed technical information.



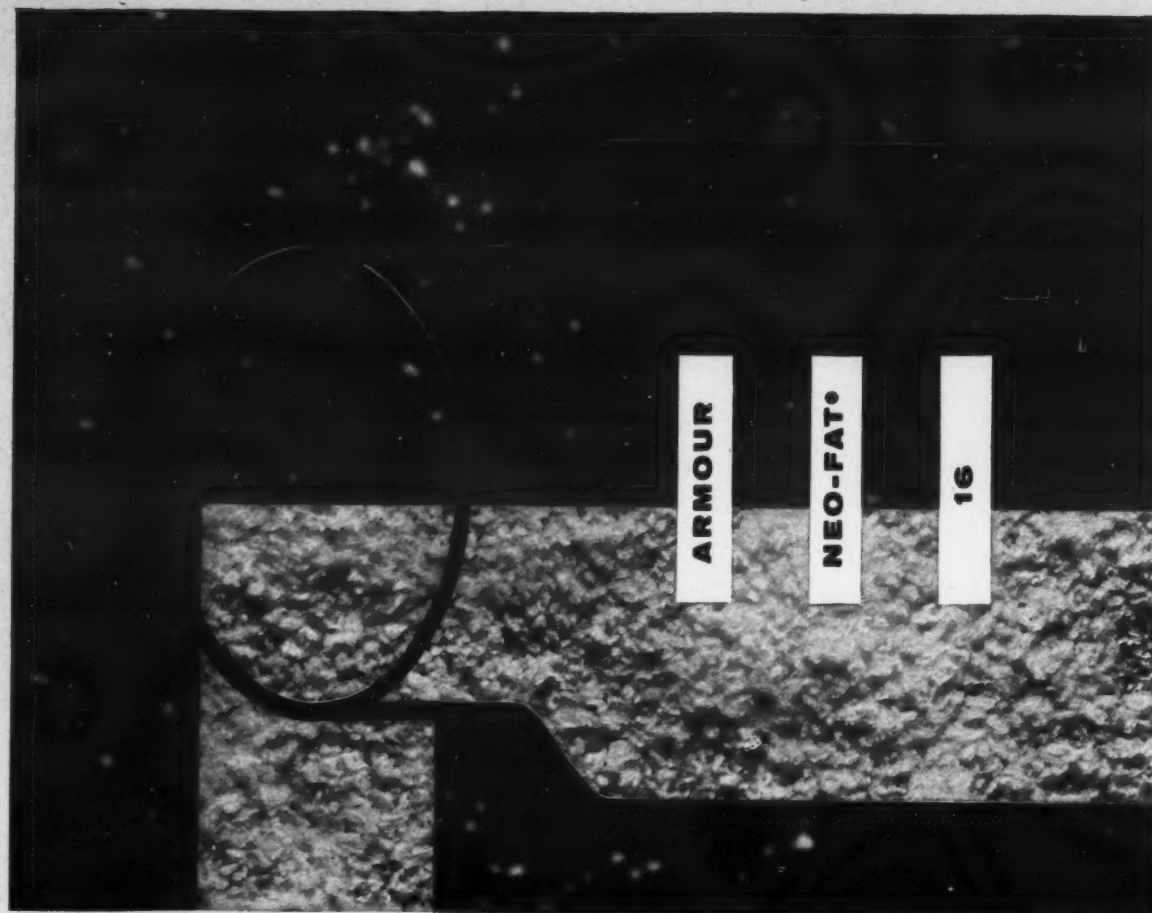
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95% Palmitic Content • Light Initial Color
Excellent Color Stability • Minimum Iodine Value

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- ☐ New 46 page brochure, "The Chemistry of Fatty Acids."
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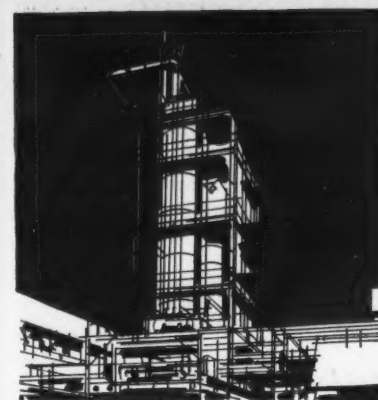
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Armour research succeeds again! And you can benefit from this outstanding achievement by producing higher quality products!

Already Neo-Fat 16 has been found superior in the plastics industry, in the manufacture of metallic soaps, emulsifiers and esters, by textile chemical producers and by many other processors.

But see for yourself how this highest purity palmitic acid improves your products. Mail the coupon for a free sample!

| SPECIFICATIONS | MIN. | MAX. | AVERAGE COMPOSITION | PERCENT |
|------------------------|------|----------|--------------------------------------|---------|
| Titer °C..... | 56 | 59 | Myristic (C-14)..... | 1 |
| Iodine Value..... | — | 1 | Palmitic (C-16)..... | 95 |
| Acid Value..... | 216 | 220 | Stearic (C-18)..... | 4 |
| Saponifiable Value.. | 216 | 221 | Oleic (C-18)..... | Trace |
| Unsaturation %.... | — | 0.3 | | |
| Moisture %..... | — | 0.2 | Animal or Vegetable Sources | |
| Color, 5 1/4" Lovibond | — | 1.0R-5Y | | |
| Heat Stability | | | | |
| @ 200° C for 2 hrs.. | — | 2.0R-20Y | Available in flake or powdered form. | |
| | | | Shipped in tank car or carload lots. | |



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Only Armour uses fractional distillation and solvent crystallization to produce a complete line of uniform Neo-Fat fatty acids offering single components in purities as high as 96%. Yet you pay no premium in price. Advantages such as these make Armour your one best source for all fatty acids. In the list below, you'll find the specific Armour Neo-Fats that will help you produce the finest esters at the lowest cost. Write us for samples and information.

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265 Double Distilled Coco
Plus tailored blends of coco fractions

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16-54 70% Palmitic
18 Commercially Pure Stearic
18-57 65% Stearic
18-58 70% Stearic
18-61 80% Stearic

● OLEIC ACIDS

Neo-Fat 92-04 Low Titer White Oleic
94-04 Low Titer Red Oil
94-10 High Titer Red Oil

When inquiring check 6406 opposite last page

Improve "wash and wear" finishes for cotton fabrics by adding thermoplastic resins . . .

finishes improve crease resistance with same fabric strength

Adding thermoplastic resin dispersions to conventional thermosetting resin formulations to produce cotton fabrics that need only "touch-up" ironing after washing, results in improved "wash and wear" finishes.

Addition of an acrylic resin dispersion, such as Rhoplex S-1, to the formulation makes it possible to improve crease resistance of a fabric while maintaining the same fabric strength. If it is desired to improve strength, addition of Rhoplex and reduction in the thermosetting resin will do this without hurting crease resistance.

The amount of resin normally used on 80 x 80 cotton fabrics is 85 lb of a difunctional thermosetting reactant-type resin (such as Rhonite R-1, a methylated alkyl urea), per 100 gal water at 75% pickup. The suggested formula is 40 lb Rhoplex S-1 and 65 lb Rhonite R-1 per 100 gal water.

The improvement in crease recovery achieved by adding the soft thermoplast to the standard formulation based on a reactant resin padding solution applied to cotton 80 x 80 fabric at 75% retention is given in the table.

| | Treatment | | Treatment | |
|---------------------|--------------------|--------------------|-----------------------------|-----------------------------|
| | 10% Reactant (50%) | 10% Reactant (50%) | 5% Acrylic dispersion (35%) | 5% Acrylic dispersion (35%) |
| | Warp | Filling | Warp | Filling |
| Crease recovery (%) | | | | |
| before FSW* | 111 | 104 | 128 | 117 |
| Tensile (1" strip) | | | | |
| before FSW* | 22 | 20 | 23 | 18 |
| Trapezoid tear (lb) | | | | |
| before FSW* | 1.7 | 1.3 | 1.6 | 1.3 |

*FSW means Full Sanforized Wash

(Information courtesy of Textile Chemicals Dept., Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . or for more information about manufacturer's product, reader may simply check 6407 on form opposite last page.)

Compilation of available bulletins on molybdenum compounds

Listing, with brief description, of all available chemical bulletins on molybdenum compounds is presented in four pages. Categories covered in listing include chemical data series, agriculture, analysis, ceramics, catalysts, and colors.

Bul CH-3 is issued by Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. When inquiring specify 6408 on form opposite last page.



For years, makers of cough syrups, lozenges, lotions and other drug and cosmetic preparations have used Glycerine to provide demulcent, humectant or solvent action. Recent research with new thickening agents indicates that these properties of Glycerine will soon be extended to a whole new range of pharmaceutical preparations.

Glycerine has been known for years to be compatible with conventional water soluble gums and gelling agents such as Gum Arabic and Karaya. New studies show that Glycerine is also compatible with a majority of the new synthetic gums. In most cases, Glycerine supplements the bodying action of these gums, and

the resultant formulations are relatively unaffected by freezing and thawing.

Other fields, too, will benefit from this compatibility of Glycerine. Nontoxic lubricants are now possible. Important improvements in printing inks, grinding and polishing pastes, gasket seals—all making use of Glycerine's unique balance of properties—are promised.

The versatility that has won such wide acceptance for Glycerine in the past continues to open new doors to chemical progress. In paints, foods, pharmaceuticals, packaging . . . for tomorrow's surge of specialties . . . in new formulations, reactions and processes, nothing takes the place of Glycerine.

This balanced group of properties keeps

Glycerine's usefulness growing

HYGROSCOPICITY • STABILITY •
SOLVENT POWER • VISCOSITY • NONVOLATILITY •
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HUMECTANT •
CARRIER • SOLVENT • LUBRICANT • SOFTENER •
EMOLLIENT • ANTI-FREEZE • ALKYL BASE •

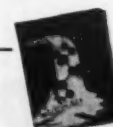
☒ CHECK AND SEND FOR TECHNICAL DATA



☐ 20-page booklet on
Glycerine for product
conditioning



☐ 8-page booklet on
"Federal Specifications for Glycerine"

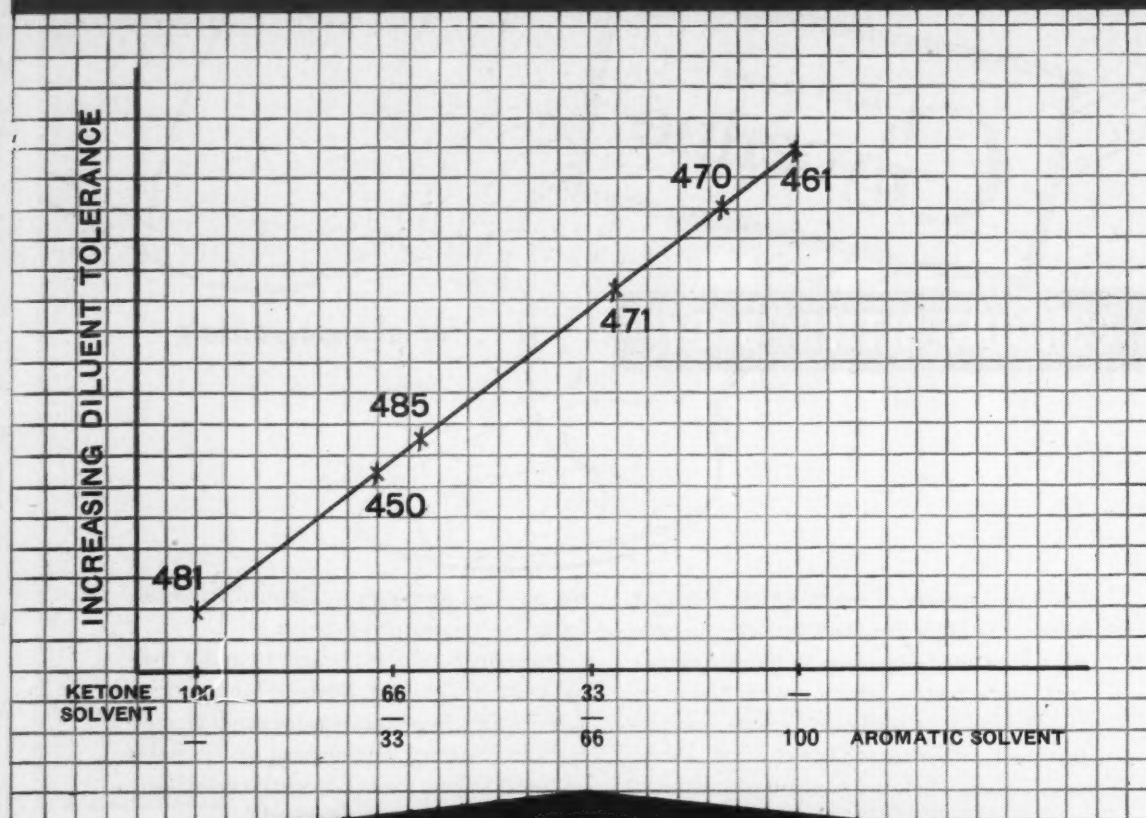


☐ 16-page booklet on
Glycerine properties
and applications

For your free copy of any or all of these booklets write: GLYCERINE PRODUCERS' ASSOCIATION • 295 Madison Ave., New York 17, N. Y.

When inquiring check 6409 opposite last page

EXON SOLUTION RESINS—VINYL CHLORIDE TYPE



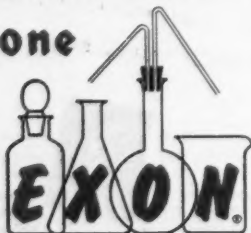
Pick your proper solution resin...at a glance!

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These 6 EXON solution resins are engineered precisely, varying in properties to suit various applications and uses—but never varying in quality of performance.

Further product details at right. Keep this chart handy to help you choose easily and accurately.

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For complete information and technical service, call or write:

EXON 450—Ideal for strip coatings. Good solubility, tensile strength and durability.

EXON 461—A unique fluorine-containing resin combining high solubility, unusual chemical resistance, heat stability and weatherability.

EXON 470—Excellent adhesion to metals, alkyd and vinyl surfaces. Compatible with wide range of drying oils, alkyds, phenolics, melamines. High solubility in inexpensive solvents.

EXON 471—Excellent for weatherability and durability in a protective coating. Corrosion resistant. No measurable change after sunlamp exposure for 360 hours as 1 mil film.

EXON 481—Makes possible colorful, abrasion-proof, washable coatings that resist fading or cracking.

EXON 485—For superior strip coatings. Lower viscosity makes application easier and shelf-life better. Good clarity.

When inquiring check 6410 opposite last page



F. L. LaQue

Management and Corrosion Problems

(Continued from page 9)

sufficient authority to enable them to be effective when important decisions are to be made.

Beyond this, management should recognize that the best assurance of further progress in reducing losses due to corrosion will depend on increases in our fundamental knowledge of the nature of corrosion, what makes it go, and how to stop it. A practical means of assuring such an addition to our basic information is immediately available. It can take the form of a contribution to the fund being raised by the Corrosion Research Council organized under the auspices of the Engineering Foundation. This Council is currently sponsoring fundamental research on corrosion for which it is seeking support by industry to the extent of about \$100,000 per year.

Note: Further details of the program of fundamental corrosion research can be secured by addressing the Executive Secretary, Corrosion Research Council at 29 West 39th Street, New York City.

Mr. LaQue's pertinent remarks on Management and Corrosion Problems set the stage for our "Corrosion Spotlight" which appears on the following pages. As management men and corrosion engineers, you should benefit by following through along the lines suggested by Mr. LaQue.

To help you improve corrosion control in your plant, many stories in the following pages have been developed in cooperation with corrosion engineer readers such as Mr. Elmer Boehm of Davison Chemical (see page 62).

We've quizzed the entire industry to obtain stories on the latest weapons for fighting corrosion. One particularly outstanding feature story of this type is on the glassed centrifugal pump (page 94).

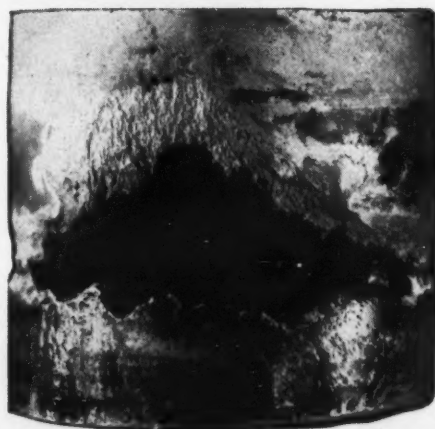
Corrosion Key data on aluminum, submitted by R. S. Dalrymple, Chief Corrosion Engineer of Reynolds Metals Company, (page 80) is another highlight that we feel will be of high interest. You'll find many other useful ideas in this month's "Spotlight on Corrosion."

After you have read the section, we will welcome your comments.

THE EDITORS

This month
CHEMICAL PROCESSING
spotlights
its regular section on

CORROSION CONTROL



- ▶ performance of tantalum and Haveg at Verona Chemical 52
- ▶ vinyl coatings defy corrosion at Davison Chemical 62
- ▶ save \$10,000 on valve maintenance in first year alone 63
- ▶ how Westvaco filters phosphoric acid 70
- ▶ chemical-resistant hose allows quick changes in pilot plant 72
- ▶ nickel valves handle hot caustic 78
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- ▶ glassed centrifugal pump now available 94
- ▶ fume system with Dynel overlay withstands hydrofluoric 102
- ▶ recent technical papers on corrosion control 106



corrosion control

Fig 1—Chief Chemist Dorer checks one of the tantalum heat exchangers on the Haveg tank used for reacting dye intermediates with 32% HCl

CP Staff Photo

Fig 2—Looking through the manway on top of the tank, the stirring paddles, heat exchangers, and their protective shields are seen. Curved baffle on side of tank (right) increases turbulence of mix

One operation at Verona Chemical Company, Newark, N.J., involves a reaction with 32% hydrochloric acid at 75-80°C. Reaction tank and steam heaters have to withstand these conditions. Verona Chemical finds that their . . .

tantalum heat exchangers and Haveg tank do the job

FRANK E. McELROY, Assistant Editor
With HERBERT H. DORER, Chief Chemist
Verona Chemical Company, Newark, N. J.

Problem: A 600 gallon metal reaction tank, equipped with a heavy metal steam coil was slowly dissolving away. Besides this, alternate heating and cooling of the batches was causing a weakening of steam coil where it was joined to tank.

Reaction tank was used for one step in making a dye intermediate at Verona Chemical Co., Newark, N.J. In this step, a mixture of organic and inorganic chemicals was poured in the tank and then about 10% (by volume) of 32% hydrochloric acid was added. The whole cycle took about ten to twelve hours and was under constant stirring.

The HCl reacted with the metal used for the tank and coil, forming a chloride compound. This compound was soluble in the intermediate and not

(Please turn to page 54)

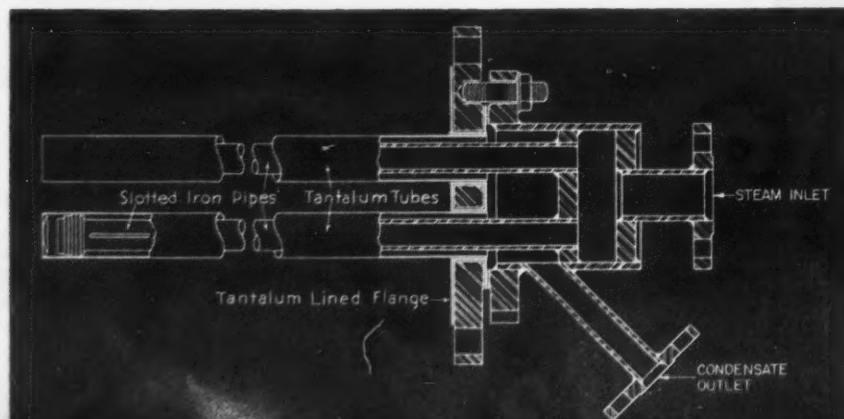
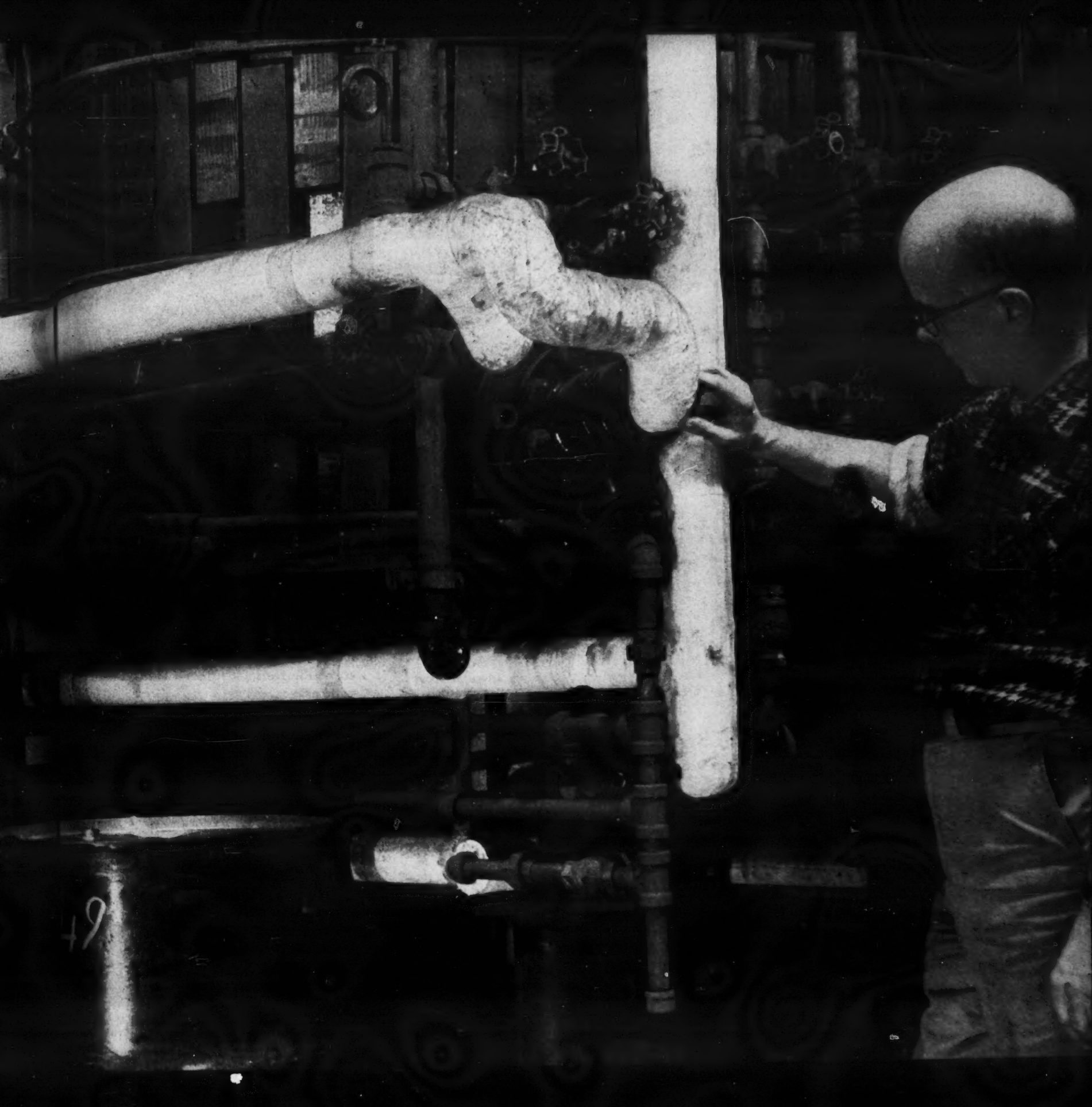
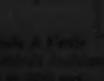


Fig 3—Cutaway of a tantalum bayonet heat exchanger





Model A Panicle
Capacity: 25 to 500 gal.



Model B Panicle
Capacity: 25 to 500 gal.



Model C Panicle
Capacity: 25 to 500 gal.

LEE

CORROSION-RESISTANT
**PROCESSING
EQUIPMENT**
IS
PRECISION BUILT
TO YOUR
SPECIFIC
REQUIREMENTS
TO GIVE
LONG YEARS OF
PEAK PERFORMANCE
WITH
LOW MAINTENANCE



Mixing Tank
25 to 500 gal.



Pulp Tank
500 to 2,000 gal.



Storage Tank
100 to 5,000 gal.



Model 120
Capacity: 25 to 500 gal.



Process Tank
Capacity: 25 to 500 gal.



Model 100
Capacity: 25 to 500 gal.



Model 100
Capacity: 25 to 500 gal.

LEE METAL PRODUCTS CO., Inc.

412 Main Street
Philipsburg, Pa.



Model 100
Capacity: 25 to 500 gal.



Model 100
Capacity: 25 to 500 gal.



Vertical Tank
Capacity: 25 to 500 gal.

54

(Continued from page 52)

Solution: About two years ago, Verona installed a Haveg reaction tank of 600 gallon capacity and with walls $\frac{3}{4}$ inch thick. It was equipped with four pairs of tantalum bayonet heat exchangers 0.013 inch in wall thickness and 36 inches long by $1\frac{1}{2}$ inches OD. Each has a $\frac{3}{4}$ IPS tube down the center for inlet steam. Cutaway is shown in Fig 3. Units have a total of 9.5 sq ft of heating surface.

Guard against abrasion

Because of the abrasive nature of the reaction mixture, Verona engineers shielded the exchangers from direct impingement of the slurry by placing Haveg baffles on the "upstream" side of the exchangers, as shown in Fig 2, the view looking down the open manway on the top of the Haveg tank.

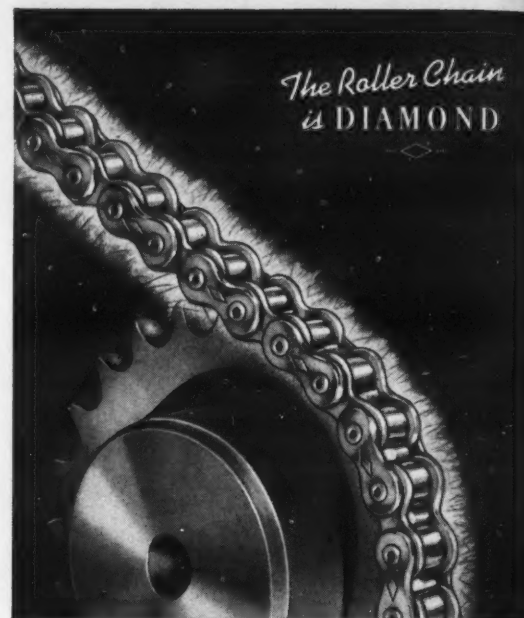
Since Verona Chemical had no troubles with the former stirring setup, they reinstalled this in the new Haveg tank. This setup consisted of a steel shaft, covered with lead, and with rectangular lead paddles set on an angle (see Fig 2). Shaft is driven at about 100 rpm by a V-belt and sheave arrangement.

Mixing cycle is ten to twelve hours long. Charging takes two hours, heating to 75-80°C takes two more, and hold time is six to seven hours. Cooling takes another two to three hours.

No maintenance required

Results: There has been no corrosion of either the tank or the heating units, and except for painting the outside of the tank, no maintenance has been required.

Because the tantalum heat exchangers are such good heat conductors, square feet of heating surface was reduced to about 1/25th of that of the former coil. Steam pressure has also been cut from 85 psig to 35 psig.



How to select chains for use where corrosive conditions exist

For power transfer and conveying movements on equipment used in industries like food and beverage, chemical, pharmaceutical, pulp and paper, etc., Diamond corrosion-resistant Roller Chains are in wide usage.

These Chains made of stainless steel or bronze incorporate the same Diamond uniform high quality, long-life performance—and positive non-slip operation.

DIAMOND CHAIN COMPANY, Inc.

Dept. 411, 402 Kentucky Avenue, Indianapolis 7, Indiana
Offices and Distributors in All Principal Cities

Pages 104 to 110 from catalog 649 include tables on how to select chain to meet hundreds of varying conditions created by the presence of corrosive agents. Copies on request.



When inquiring check 6412 opposite last page

CHEMICAL PROCESSING

CORROSION

(Tantalum heat exchangers are products of Fansteel Metallurgical Corp., Dept. CP, 2200 Sheridan Rd., North Chicago, Ill. . . . or for more information check 6413 on form opposite last page.)

(Haveg tank is product of Haveg Corp., Dept. CP, 900 Greenbank Rd., Wilmington 8, Del. . . . or for more information check 6414 on form opposite last page.)

Multiplies service life of metal rods 64 times . . .

No. 20 alloy withstands
sulfuric acid

In one application, 1/2" rods of No. 20 stainless alloy and Type 316 stainless were installed in service involving sulfuric acid varying from 0 up to 58% concentration at 158°F.

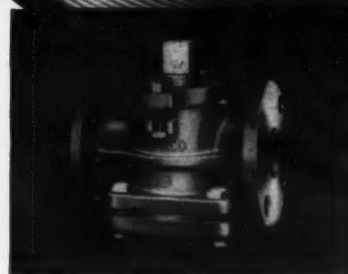


While rod of former metal (left)
corroded quickly in sulfuric, No.
20 alloy is in good condition

After four days, the 316 rods failed and were replaced with 1/2" No. 20 rods. No. 20 rods showed no signs of corrosion whatsoever after being in service 3,700 hours of a possible 6,100 hours over a period of 256 days.

Type 316 is satisfactory for many corrosive conditions, but in this particular application No. 20 alloy was required.

(No. 20 stainless is product of the Carpenter Steel Co., Dept. CP, Reading, Pa. . . . or for more information reader may simply check 6415 opposite last page.)



DURCO Type F valves are manufactured under one or more of the following patents. U. S. Patent Nos. 2713987, 2729420, 2735645, 2728550. Patented in Canada, 1955, No. 519424.



THE DURIRON COMPANY, INC., DAYTON, OHIO

Branch Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia and Pittsburgh.

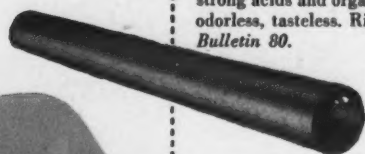
When inquiring check 6416 opposite last page

ACE offers 100 years experience to STOP CONTAMINATION

To prevent discoloration, taste, odor or metallic pick-up in your processes, you'll find the best, most economical piping, pumps, valves and tanks among the many ACE rubber and plastic materials. Wide range of temperatures, pressure, impact resistance. Phone nearest American Hard Rubber Company distributor, or write for Technical Data CE-50.

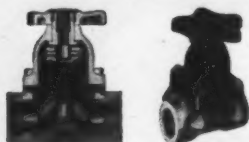
TOUGH ACE-ITE PLASTIC PIPE

General-purpose moderately priced rubber-plastic pipe handles most common chemicals to 170 deg. F. . . except few strong acids and organic solvents. Tough, odorless, tasteless. Rigid pipe ½" to 6". Bulletin 80.



VALVES

for all-plastic piping systems



Trouble-free plastic diaphragm valves . . . choice of general-purpose ACE-ITE, ACE PARIAN (polyethylene) or ACE SARAN. Handles most corrosive chemicals and food ingredients. Sizes ½" to 2", 50 psi. at 77 deg. F. Bulletins 80 and 351.



1001 USES for ACE-FLEX Tubing

Excellent chemical-resistant, all-purpose flexible plastic tubing. Sparkling clear, easy to clean, odorless, non-toxic, can be steam-sterilized. ¼" to 1" ID. Bul. 66.

RIGID VINYL . . . STRONG. AGE-PROOF

ACE RIVICLON is a new rigid threaded plastic pipe with good aging and high impact strength. Not affected by most inorganic acids and alkalis, also excellent for many organics. Sizes ½" to 4". Ask for Bulletin CE-56.



processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 6417 opposite last page

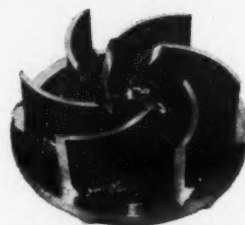
CORROSION

Resists free chlorine and HCl at 125°F at Wyandotte . . .

impeller's service life estimated in years rather than months

Problem: Wet chlorine attack limited service life of impellers used in one phase of operations at Wyandotte Chem. Corp.'s Wyandotte, Mich., plant to six months. Impellers operated in a solution of organic chlorides containing 3½% hydrochloric acid at 125°F. High-nickel-chromium-molybdenum alloy could successfully resist HCl but suffered serious attack when free chlorine was released periodically in the process.

Solution: In late 1954 Wyandotte fabricated an impeller from titanium. Blades were hot pressed to desired shape. Impeller was



Impeller has served for more than a year in 3½% HCl at 125°F and free chlorine

welded, using Heli-arc welding with 0.093" diameter titanium welding wire as filler rod. Welding was performed in an air-tight chamber filled with helium.

Final assembly was machined to finished dimensions and balance. Unit was fitted with a titanium shaft and key to avoid possibility of galvanic corrosion.

Results: After more than a year of service there is no sign of attack on any of impeller's surfaces. Service life is expected to run into years — as compared to the six months previously experienced with other metal alloys.

(A-55 titanium for impeller was supplied by Rem-Cru Titanium Inc., Midland, Pa. . . or for more information check 6418 on form opposite last page.)

PROTECT against CORROSION with ATLAS



RIGID PLASTIC FABRICATIONS

Complete fume exhaust systems, processing tanks and equipment can be fabricated to meet your specifications. Resistant to a wide range of processing chemicals.

RIGID PLASTIC PIPING

Pipe extruded in i. p. s. sizes from ½" to 6" to convey corrosives to and from processing equipment. A complete stock of flanges, valves and fittings in all standard sizes.

Write for Bulletin 9-2 on Atlas Rigid Plastics

A complete corrosion service for the chemical industry.

SERVING
INDUSTRY
SINCE
1892

**ATLAS
MINERAL**
MERTZTOWN, PENNSYLVANIA

Technical Representatives throughout the U. S.

When inquiring check 6419 opposite last page

New IMPERIAL Nylo-Seal Tube Fittings

The Economical Corrosion-Resistant Fittings of DuPont "Zytel" (Nylon)

. . . for use with Stainless Steel, Nylon, Polyethylene and other tubing.



Ask for Bulletin 3049

Nylo-Seal Fittings save up to 90% in fitting costs as compared to stainless steel fittings. Also effect substantial savings in installation time.

Excellent for instrument, lubricant, air, hydrocarbon fuel, oil, coolant and low pressure hydraulic lines, food processing, laboratory, chemical and many other applications. Fittings available in sizes ¼" to ½" O.D.; Nylon Tubing in sizes ¼" to ¾" O.D.

Withstands temperatures from -70° to +250°F.

Withstands working pressures of 250 psi. at temperatures to 120°F.

Resistant to most acids and alkalis.

Cuts installation time . . . no flaring.

See Your Imperial Industrial Distributor

THE IMPERIAL BRASS MFG. CO., 1200 W. Harrison St., Chicago 7, Ill.
In Canada: 334 Laurier Ave., Toronto, Ontario

IMPERIAL Industry's Most Complete Line of Tube Fittings and Tubing Tools

When inquiring check 6420 opposite last page

CHEMICAL PROCESSING

CORROSION

**Wear and tear reduced
on vessel walls
with steel mesh . . .**

material can be obtained in
430 stainless

Uses: For lining interior of
catalytic regenerators, reactors,
gas stacks, cyclones, and other
equipment.

Features: Use of the retainer
mesh makes linings last longer
and protects shell.



Hexagonal mesh used as armor
and retainer for castable ma-
terials in cyclone unit

Description: Retainer mesh is
made of steel bars on edge, fas-
tened together in a hexagonal
pattern. Loose clinch is used in
manufacturing the product when
it is used on curved surfaces.
Mesh is also available in Type
430 stainless steel.

Retainer mesh is usually welded
to the inside of steel shells, then
ganister or castable refractory
material is gunned into the
meshes. In this way erosion that
might be caused by bombard-
ment of catalysts is avoided. Any
crack that develops is restricted
to a single mesh of retainer.

(Gridsteel contour retainer mesh
is product of Irving Subway
Grating Co., Inc., Dept. CP, 27th
St., & 49th Ave., Long Island
City 1, N.Y. Check 6421 on form
opposite last page.)

For more information on prod-
uct at right, specify 6422 . . .
see information request blank
opposite last page.



PROPERTY AND APPLICATION DATA
ON THESE VERSATILE ENGINEERING MATERIALS:
"ZYTEL," "ALATHON," "TEFLON," "LUCITE."

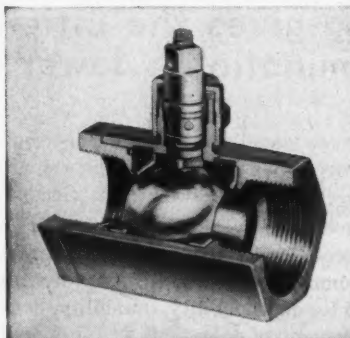
NEWS

Filter unit of Du Pont TEFLON® is compact, lightweight and chemically inert

**New dripless sleeve of
ALATHON® polyethylene resin
provides safe handling
of chemicals**



Sleeves of "Alathon," fitted on the necks
of chemical bottles, increase handling
safety in the laboratory by eliminating
drip during pouring. Keeping the outside
of the bottles dry protects hands from
acid burns, reduces chances of slipping,
and prevents defacing of labels. Resistance
to wetting of "Alathon" makes this possi-
ble. (Molded by A. L. Hyde Co., Gren-
loch, New Jersey).

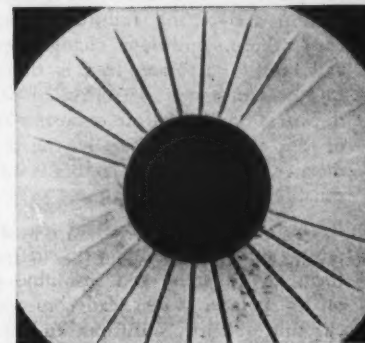
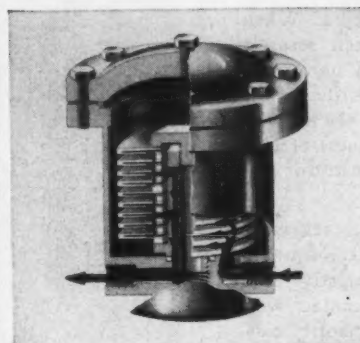


Valve seats of TEFLON®

provide tight, long-lasting, chemically inert seals.
With seats of "Teflon" these valves are able to
handle practically all known fluids and gases—
in extreme temperature ranges. They also offer
the advantages of economy by reducing main-
tenance time. (Manufactured by the Jamesbury
Corp., Worcester 5, Massachusetts. Processors—
Crane Packing Co., Chicago, Illinois, and Fluoro-
carbon Products Inc., division U. S. Gasket Corp.,
Camden, New Jersey.)

NEED MORE INFORMATION?

Clip the coupon for additional data
on the properties and applications of
these Du Pont engineering materials.



Filter disc with vari-depth molded passageways (right). Note both radial and concentric
grooves. By a unique welding process, the manufacturer seals the edges of two of these discs
with the molded surfaces mated to form a filter segment. These are then stacked on a
stainless-steel mandrel with washers of "Teflon" (left). (Manufactured by Porous Plastic
Filter Co., Inc., A Pall Filtration Company, Glen Cove, New York.)

Porous "Teflon" tetrafluoroethylene
resin is the most modern filtration
medium available to industry. Like
the solid form, porous "Teflon" is
chemically inert, thus providing a fil-
ter medium unexcelled for use with
all strong acids, all alkalies, oxidants
and organic solvents. Even such se-
vere corrosives as fuming nitric acid,
hydrofluoric acid, aqua regia, hydro-
gen peroxides and concentrated caustics
are readily filtered with "Teflon."

These filters of porous "Teflon"
offer a large filter area in a limited
space. (See photographs). Nine 3½"
O.D. segments of "Teflon" equal one
square foot of filter area. These fil-
ters will remove particles of 3 mi-
crons in fluid filtration and 0.1 mi-
cron in gas filtration. The filters
permit a high-capacity flow and re-

quire no gasket. Its extreme toughness
and resiliency recommend "Teflon"
for use in gaskets, packings and com-
ponent parts of pumps, agitators,
mixers—and for valve seats and discs.

Filters of "Teflon" are often used
as polishing filters, following other
types. No downstream lint is present
in material filtered by porous "Tef-
lon." The non-adhesive quality of
"Teflon" enables these filters to be
easily cleaned with any solvent, and
they can be readily sterilized.

"Teflon" can operate through a
temperature range of -450° F. to
500° F. Can you use the unique com-
bination of properties "Teflon" has
to offer? Send the coupon below for
further information on how "Teflon"
can be advantageous in chemical
applications.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department
Room 787 Du Pont Building, Wilmington 98, Delaware
In Canada: Du Pont Company of Canada Limited, P.O. Box 660, Montreal, Quebec

Please send me complete
property and application
data on Du Pont "Teflon" ☐
and "Alathon" ☐.
I am interested in evaluat-
ing these materials for

Name _____
Firm Name _____
Position _____
Type of Business _____
Street Address _____
City _____ State _____

CORROSION CONTROL

**Absence of local corrosion,
ability to passivate
advantages of lead . . .**

properties varied in different grades by alloying elements

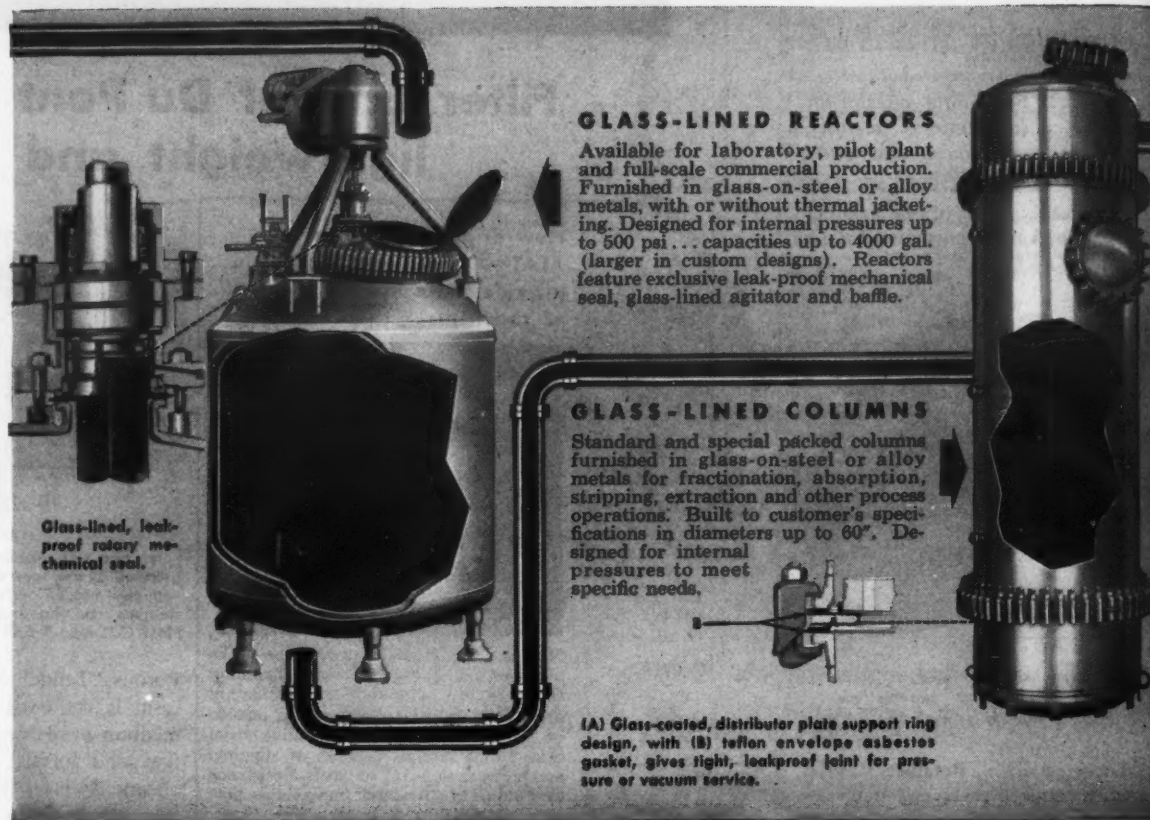
Among the advantages that have made lead a valuable material for battling corrosion is its property of rarely being subject to local corrosion. When exposed to hot chlorides or strong alkalis, for example, lead undergoes a uniform thinning; seldom are pitting failures encountered. When used where conditions change between severely and mildly corrosive, lead is thinned uniformly. Life of equipment is controlled primarily by the thickness of lead before exposure and the severity of that exposure. Generally, the thickness of lead dictated by mechanical factors is adequate for reasonable life.

Reason for lead's excellent corrosion resistance is its ability to react with its environment to form an adherent and insoluble protective film on its surface. When lead comes in contact with chromic, sulfuric, sulfurous, and phosphoric acids, a protective, non-metallic is formed immediately. This minimizes further reaction with the lead and serves as an effective barrier to more corrosion. Even when this protective film is damaged by severe conditions — such as abrasion, or exposure to hot nitric or hydrochloric acid — it will re-form immediately upon re-exposure to a film-forming agent such as sulfuric acid.

Still another factor that must be taken into consideration when figuring the cost of a lead installation is the high return for lead scrap when the equipment goes out of service. Scrap value of lead is a high proportion of original cost as compared with competitive materials. Different grades of lead — each of which exhibits different corrosion-resistant properties — are as follows:

- 1—Chemical lead is one grade that has found wide acceptance within industry. This grade contains 0.002 to 0.020% of silver and 0.080% copper.
- 2—Asarco acid lead is wholly refined lead alloyed with minute percentages of other elements, including copper, added specifically to improve corrosion resistance. Another advantage of this type is the diminution of the tendency of the lead to "creep".
- 3—Antimonial lead is lead alloyed with from 2 to 12% of antimony (usually 6%) to increase mechanical properties at temperatures below 200°F. It is commonly called hard lead. Since this type of lead has good abrasion resistance, and is harder than chemical lead, it is useful in tank construction. However, it is not suitable for use at temperatures exceeding 200°F.

Whatever your process . . . insist on Glascote glass-lined products



GLASS-LINED REACTORS

Available for laboratory, pilot plant and full-scale commercial production. Furnished in glass-on-steel or alloy metals, with or without thermal jacketing. Designed for internal pressures up to 500 psi . . . capacities up to 4000 gal. (larger in custom designs). Reactors feature exclusive leak-proof mechanical seal, glass-lined agitator and baffle.

GLASS-LINED COLUMNS

Standard and special packed columns furnished in glass-on-steel or alloy metals for fractionation, absorption, stripping, extraction and other process operations. Built to customer's specifications in diameters up to 60". Designed for internal pressures to meet specific needs.

(A) Glass-coated, distributor plate support ring design, with (B) tuffon envelope asbestos gasket, gives tight, leakproof joint for pressure or vacuum service.

**Glass-lining gives the ultimate in corrosion-resistance . . .
zero contamination . . . lower cost through longer service life**

YOU can use Glascote glass-lined equipment — from start to finish — for processing a variety of corrosive materials. Glascote's glass-linings put an end to contamination.

Whatever your processing system, you, too, will find it profitable to use Glascote's glass-lined equipment — pipe and fittings, reactors, columns, storage tanks, rotary dryer-blenders, etc. All designed for dependability, durability, flexibility of application and economy of operation.

What's more, you can be sure of product purity, because Glascote's chemical-resistant, acid-alkali glass offers greater resistance to corrosive action . . . greater versatility for processing products. And Glascote also offers you non-stick glass which is ideal for polymer production of all types.

Remember, for efficient heat transfer and extra-long service life insist on Glascote glass-lined products.

Ask the representative who calls on you for all the facts about Glascote products—reactors, storage tanks, columns, conical rotary dryer-blenders, receivers, condensers and accessory products. Or, if you prefer, write direct, Glascote Products, Inc., Cleveland 17, a subsidiary of A. O. Smith Corporation.

Our standard one year guarantee continues to apply to all Glascote glass-lined products.

Glascote®

PRODUCTS, INC.

CLEVELAND 17, OHIO

Sales offices or agents located in New York • Philadelphia • Union, N. J. • Chicago • Cleveland • Dayton • Houston • Los Angeles
Export Sales: A. O. Smith Corp., International Div., Milwaukee 1, Wis.

from START to FINISH

GLASS-LINED HEAT EXCHANGER TUBES

Efficient, corrosion-resistant Heat Exchangers are assembled from lengths of standard diameter jacketed pipe. Adequate heat transfer area is available for most applications using various heating and cooling media. The use of either elbows or return bends provides a versatile operating assembly.

GLASS-LINED STORAGE TANKS

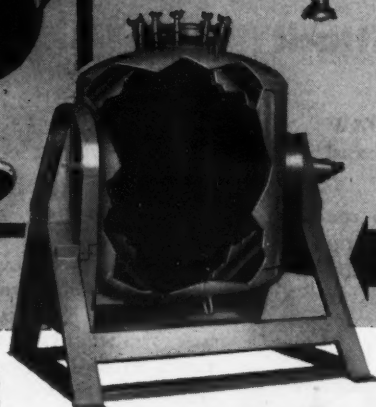
Single shell glass-lined horizontal furnished in standard units in capacities up to 6000 gal. (larger on special order).

Vertical glass-lined units furnished in four standard structural types—plain and jacketed, open and closed. Standard tanks built in capacities up to 6000 gal. (larger on special order).



GLASS-LINED PIPE AND FITTINGS

Glascote produces and stocks glass-lined pipe in 10' lengths and fittings to ASME standards, in inside diameters from 1½" to 4". Six and 8", and larger sizes are fabricated to order. Leakproof gaskets available to suit material conveyed in pipe.



GLASS-LINED CONICAL, ROTARY DRYER-BLENDEES

Standard acid-alkali, glass-lined, conical, rotary Dryer-Blenders available in capacities—5 and 35 cu. ft. and larger on request; operating temperatures—liner 500° F., jacket 650° F.; operating pressures—tank full vacuum to 25 psi, jacket 65-75 psi (50-60 psi with tank at full vacuum).

CORROSION CONTROL

4—Tellurium lead is chemical lead to which has been added a fraction of a percent tellurium for added resistance to fatigue failure due to vibration. This type strengthens under strain.

(From information furnished by E. C. Reichard, Research Metallurgist, Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N.Y. . . . or for more information on lead as a corrosion-resistant construction material check 6424 on form which is located opposite last page.)

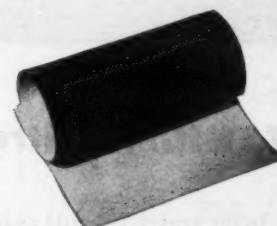
Permits bonding of Teflon to most materials . . .

cementable product available in sheets and in tape form

Uses: As a lining and covering for tanks, piping, fittings, rolls and other metallic and non-metallic surfaces.

Features: Product can be bonded to most materials by the use of standard commercial adhesives.

Description: Cementable Teflon is available in sheets and in tape form. Good bond strengths are obtained between product and aluminum, mild steel, wood, and Teflon itself. Teflon sheets and tape are non-porous and uniform in thickness. Material is impervious to acids and alkalis.



Cementable Teflon is impervious to acids and alkalis

(Cementable Teflon is product of John L. Doré Co., Dept. CP, 5406 Schuler St., Houston 7, Tex. . . . or for more information check 6425 on form opposite last page.)

A subsidiary of **A.O. Smith Corporation**

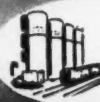
The World's largest manufacturer of glass-lined steel products



Permaglas water heaters



Glass-lined beer storage tanks



Glass-lined bulk storage units



Glass-lined aircraft electrical equipment



Glass-lined pump parts

When inquiring check 6423 opposite last page

you are reading
**chemical
processing**
For Men who
Manage

... because your are responsible for some phase of processing in your company. The Editors explain how you and other "men who manage" these operations are selected to receive the magazine regularly.

... see page 118.



TITANIUM ...Strongest Defense Against "All-Out" Attack

In the ceaseless battle against corrosion, B&W Seamless Titanium Tubing is providing a first and most powerful defense.

B&W Titanium Tubing is the practical result of many years of experience in making tubes of carbon steels, stainless steels, other alloys. It superbly combines maximum corrosion resistance and easy workability.

For example, the superior qualities of B&W Titanium Tubing made it the natural choice of Struthers Wells Corporation for fabricating the all-titanium heat exchanger shown above. This unit, now performing perfectly in service, is 12 ft. long, x 17½ inches diameter and weighs 2200 lbs.

This case, like many others, shows how B&W Seamless Titanium Tubing met the need and solved the problem for a fabricator.

Get answers to *your* questions on why to use ... what to use ... how to use titanium tubing ... call on Mr. Tubes. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



TA-5080(P)

Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

When inquiring check 6426 opposite last page

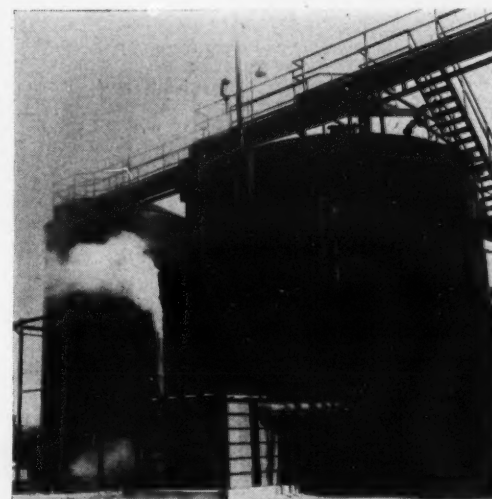
CORROSION CONTROL

Stauffer protects storage tanks from acid fumes and weather with rubber-base enamel . . .

coating has served for more than three years and is still in good condition

Problem: Exterior of acid storage tanks at Stauffer Chemical Co.'s Hammond, Ind., plant were subjected to a variety of corrosive fumes and extremes in weather. Sulfuric acid, sulfur trioxide, and sulfur dioxide fumes, steam vapor, and sulfur dust at temperatures dictated by existing weather conditions were the agents acting on tank surfaces. Initial protective coating peeled off within a year.

Solution: In 1953 Stauffer coated a number of tanks with a chlorinated-rubber based maintenance enamel. Material was applied after rotogrinding steel tank surface to remove all old paint, rust, and scale. First a priming coat was applied and



CP Staff Photo

Acid storage tanks at Stauffer Chemical Co. are exposed to steam, weather, and corrosive fumes

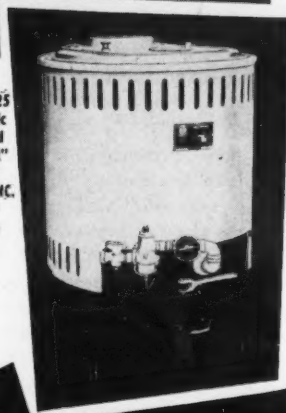
allowed to dry thoroughly. This was followed by two coats of black enamel applied at least 24 hr apart. Enamel consists of a chlorinated-rubber base, synthetic resin, and chemically resistant pigments. Product can be applied by either brush or spray. Average coverage is 350 to 450 sq ft a gallon. Dry film thickness of single coat is 1.4 to 1.6 mils.

Results: Coating has successfully protected tanks from attack by corrosive fumes and weather for over three years. Except for areas where surface has been subjected to direct acid splash, coating is in excellent condition.

(Valdura rubber-base enamel is a product of Valdura Div., American-Marietta Co., Dept. CP, 101 E. Ontario St., Chicago 11, Ill. . . . or for more information check 6427 opp. last page.)



Model S-25
Automatic
Gas Fired
"INCINOR"
Mfd. by
BOWSER, INC.
finished
in white
SICON



The sparkling white finish of this home incinerator stands flash temperatures of as high as **550° F.!**

It's **Sicon** Silicone Coating

SICON withstands the shock of high heat combustibles without peeling or blistering. Retains luster and beauty over long periods of time. Now used on all INCINOR models, SICON, the original silicone finish, has proved best for a long list of other nationally known products.

WRITE
Dept. G-3

Sicon
Silicone-Based Finish is
manufactured exclusively by
MIDLAND
Industrial Finishes Co.
Waukegan, Illinois
ENAMELS • SYNTHETICS
LACQUERS • VARNISHES

When inquiring check 6428
opposite last page

JULY 1956

CORROSION CONTROL

Strings of graphite anodes up to 500' long protect underground ducts

In several applications on both the east and west coast, recently introduced graphite anodes are being used for protecting underground ducts and cables. Assembly technique permits anode to be installed on cable exactly where needed.



Anode spacing varies from 3 to 20' in typical installations

Strings up to 500' long have been installed, with anode spacing varying from 3 to 20'. Typical resistance of a circuit is usually under 100 ohms and varies with the weather. In damp, moist weather, the resistance is naturally lower than when the ground is dry.

(Type QA graphite anode is product of National Carbon Co., div. Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N. Y. . . or for more information check 6429 on form opposite last page.)



"No, I can't play any tunes on it! Now go find the corrosion engineer!"

TANK CAR RUPTURE DISC PROBLEMS?



Model TC Rupture Discs are used for overpressure protection on tank cars under 103-A, 103-B, 103-AW and 103-BW classifications. The car shown above was built by American Car & Foundry Division of ACF Industries, Incorporated, and is owned by Shipper's Car Line Division of the same company. Lessee is Niagara Alkali Company.

New BS&B Model TC Rupture Disc Will Not Corrode Or Fatigue While Car Is In Transit!

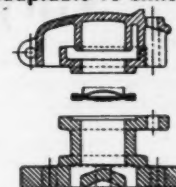
Here's a new Tank Car Disc by BS&B which meets the demand for a serviceable disc that *will not corrode or fatigue* while the car is in transit!

Engineered and manufactured by the nation's leading and oldest manufacturer of rupture discs and related equipment, the Model TC prevents unnecessary product loss and lowers maintenance costs for tank car shippers. Loadings reach their destination safely and without delays.

Adaptable to either standard bolted or threaded type tank car fittings, Model TC is thoroughly tested and proved through service by tank car builders and chemical shippers.

Available in 30 psig. and 45 psig. relief pressures. Assembly into tank car fittings conforms to sketches shown at right. Discs are furnished for tank car fittings of any design. For more information, address your inquiry to . . .

Adaptable To Either . . .



Standard Bolted Type Fitting Or . . .



Threaded Type Fitting

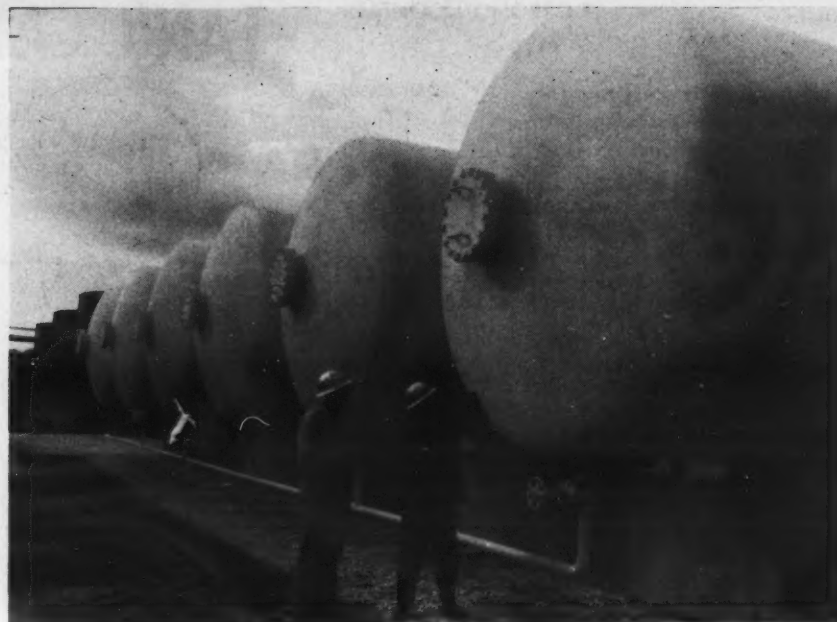


**BLACK, SIVALLS &
BRYSON, INC.**

Safety Head Division, Dept. 2-M7
7500 East 12th Street, Kansas City 26, Mo.

When inquiring check 6430 opposite last page

Elmer Boehm, (right) Plant Engineer, and Steele Hester, Master Mechanic, checking film thickness of vinyl protective coating system



While two coatings previously applied failed, one in eight months and the other in a year —

vinyl coatings defy corrosion at Davison Chemical

Present system is holding up extremely well after two years in spite of sulfuric acid spray and ammonium hydroxide in area

GORDON WEYERMULLER, Associate Editor
With **ELMER BOEHM**, Plant Engineer
Davison Chemical Co., Div. W. R. Grace & Co.
Lake Charles, Louisiana

Problem: Two former coating systems applied at the Davison Chemical plant, Lake Charles, La., failed — one in eight months and the other in a year. In the area where these coatings were used, plant annually manufactures 45 million pounds of petroleum cracking catalyst. Vapors in this area contain sulfate salts and contain intermittent sulfuric acid spray. Previous coatings had been

applied to vessels containing ammonium hydroxide solution.

Solution: In February 1954, No. 33 vinyl coatings were applied to six ammonium hydroxide storage vessels in following manner:

Surface was sandblasted to a white metal. On the same day a prime coat of No. 33 oxide red vinyl was applied by brush. Brush method of application was used on first coat to obtain good adhesion and to permit the coating to be worked into the metal. Second coat of vinyl black was applied by spray. Third coat also applied by spray consisted of vinyl white tinted with black. This was done to provide a clear distinction between the second and third coats in order to be sure that complete coverage

was obtained. Fourth spray coat of vinyl white was applied to a final total film thickness of six to eight mils.

Particular attention was given to all welds, corners, and rough areas and these areas were double-lapped to be certain of proper coverage. Black vinyl mastic was applied after the prime coat around all pipe flanges, bolts, and the junctions of the metal supports with concrete piers. This coating was applied by trowel and has prevented the usual rust stains which occur in these areas because of the difficulty in obtaining a homogeneous film. A DeVilbiss MBC spray gun equipped with a 765 air cap, D-EX fluid tip, and an MBC-496 fluid needle was used. Sufficient air pressure and pot pressure for proper atomization was maintained to obtain an even wet coat without pinholes.

During the entire sandblasting and coating period for these tanks, Davison painters were periodically checked for use of proper technique, assisted by sales engineer from company which furnished coatings. This procedure is believed to be a considerable factor in the success of the coatings.

Results: Present coating system is still holding up extremely well after two years service. About three months ago several small pinholes and mechanical abrasions were found and repaired. These pinholes were not from original application. Although these were of little consequence, repairs were necessary to prevent further damage. Coating is in excellent condition and at least another years service is anticipated with little or no maintenance.

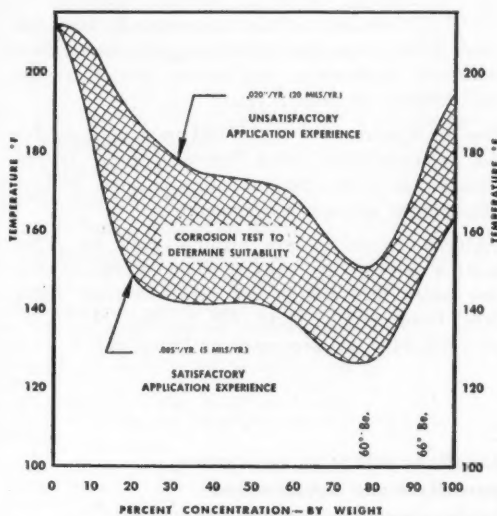
(Vinyl coatings are product of Amercoat Corporation, Dept. CP, 4809 Firestone Blvd., South Gate, Calif. . . . or for more information check 6431 on form opposite last page.)

When valves began to show signs of failure after only a few months sulfuric acid service, California Oil tested numerous replacements. Units they selected . . .

Saved approximately \$10,000 in first year alone on valve maintenance

Total of 275 double-wedge units have given nearly four years of trouble-free service

Problem: Severe packing leaks, after only a few months service, valves that were hard to open and close, and indications that shut-off was not complete flashed the danger sign to maintenance men at California Oil Co's Perth Amboy, New Jersey refinery. Valves were handling sulfuric acid ranging in strength from 98% for feed acid to 85% for acid hydrocarbon mixtures in refinery's sulfuric acid alkylation unit which manufactures aviation gasoline components.

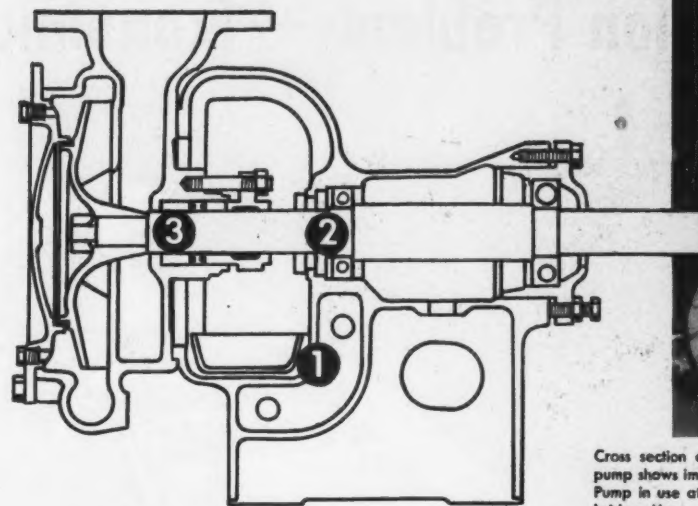


A graphic representation of application experience of Alloy 20 alloy in sulfuric acid service

Mild steel valves with renewable seat rings, stems, and discs of stainless steel, type 304, had been selected for all sulfuric acid service when plant went on stream in 1951. When trouble occurred, inspection disclosed following facts:

Corrosion was taking place on 304 stems in stuffing box area to a degree that a tight packing gland could not be maintained. Wedges were somewhat corroded and pitted, with severe selective attack taking place in both steel body and seat rings at point where rings were threaded into body. A tenacious deposit of ferrous sulfate on all internal

(Please turn to next page)



Cross section of Goulds Fig. 3715 chemical pump shows important design features. (Right) Pump in use at Lever Brothers plant at Cambridge, Mass.

How Lever Brothers pumps caustic soda up to 350° F. safely and economically

Corrosive acids and harsh alkalis like caustic soda soon eat the heart out of an ordinary pump.

Lever Brothers handles tons of hot caustic every day, making such well-known soaps as Lux, Lifebuoy, and Rinso.

To get the hot caustic from tank cars to storage, and to move it from tank to tank within the plant, Lever Brothers relies on the Goulds Fig. 3715 chemical pump.

Designed especially for handling hot, corrosive and abrasive liquids, this centrifugal pump has a number of features that give you safer, longer, more dependable performances:

Metals to fit the task. Because different metals are more resistant to corrosion

by different chemicals, the Fig. 3715 pump is stocked in type 316 stainless steel, Gould-A-Loy 20 (equivalent to AC1 CN 7M CU), all bronze, bronze-fitted, all iron, and iron or bronze with stainless steel trim. Still other metals can be supplied on order.

Cooling for hot liquids. The pump has a water-cooled support head (1), a quenching gland (2), and a water-cooled stuffing box (3). Pump can be changed from stuffing box to single or double mechanical seal construction on the job.

Easy to clean and inspect. You can clean and inspect the pump or replace its impeller without disturbing pipe connections. Axial clearance between impel-

ler vanes and casing can be adjusted externally. Completely sealed bearings keep out dirt and moisture, are grease lubricated.

No leakage. Stuffing box is on suction side of impeller, gets suction pressure only, holds leakage at a minimum.

There are 9 sizes of the Fig. 3715 pump providing capacities up to 720 GPM, heads to 200 feet.

For more information on sizes, including specifications and performance curves, write for Bulletin 725.4.

If you would like to see the pump's features in your own office, we can arrange to show you a small-scale aluminum model.



Caustic soda going into these famous Lever Brothers products is handled safely, dependably by Goulds Fig. 3715 chemical pumps.



Goulds chemical pump handles hot fatty acids in an oil processing plant. Water-cooling and quench gland protect pump from hot acids and alkalis.



Goulds chemical pumps circulate hot size in textile plant. Pumps were especially designed to handle hot, corrosive and abrasive liquids.



Sales Offices: Atlanta • Boston • Chicago • Houston
New York • Philadelphia • Pittsburgh • Tulsa



When inquiring check 6432 opposite last page

New TARSET Licks Tough Chemical Corrosion Problems—Economically!



For the economical control of corrosion in tough spots like the acid bath shown above, new Pitt Chem Taret has no competition! No other protective coating on the market today offers you the broad corrosion-resisting properties and relative low cost of this unique coal tar-epoxy resin coating.

Taret offers unusual resistance to most acids, alkalis and salts. It is especially recommended for the protection of storage tanks, precipitator tanks, bulk material conveyors and similar equipment where corrosive conditions are severe.

Taret does not shatter or loosen when subject to extreme impact tests. And it actually becomes harder at elevated temperatures! It can be applied by spray, brush, or roller.

What can Taret do for you? If you have a stubborn corrosion problem that must be solved within a definite maintenance budget, Pitt Chem Taret may be your answer. We'll be glad to send you complete technical data and samples for testing.



Send for Descriptive Booklet on TARSET today

Free booklet tells how to use amazing new Taret to reduce costly corrosion. Gives detailed description of Taret's specifications, properties and application characteristics. Write for your copy today!



COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check 6433 opposite last page

CORROSION CONTROL

(Continued from preceding page)

steel surfaces was preventing wedges from finding a true seat.

Solution: Problem was placed in hands of Calso materials group for study. A number of various makes of valves were installed for prolonged trial. After 75 days however, problem of failure on alloy trim valves became so acute that test valves were removed and examined to determine a replacement program. On basis of this inspection Alloyco 20 Figure 111 gate valves were selected and first lot installed in April 1952. Since then about 275 units have been placed in service.

Valves chosen have double wedge construction consisting of two spherical discs held and guided by special disc holder attached to stem. Each disc has individual flexibility and forms its own seal when closing pressure is applied. Alloy used for body, bonnet, stem, disc assembly, packing gland plate, and gland follower has following composition: chromium 19-21%, nickel 28-30%, copper 3.5-4.5%, molybdenum 2.0-3.0%, silicon 1.5% max, manganese 0.65-0.85%, carbon 0.07% max.

Results: Cost of maintenance and replacement on 275 original valves, at schedule indicated by initial performance, would have been \$10,000 per year. Valves now in service have given nearly four years of continuous, trouble-free service, saving this amount of money yearly.

Due to tightness of closure obtained with double disc construction, valve has also been recommended in a number of non-corrosive services where tight shut-off was imperative.

(Alloyco 20 valves are manufactured by Alloy Steel Products Co., subs of The Walworth Co. For more information on valves contact Alloy Steel Products Co., Dept. CP, Linden, N. J. . . . or check 6434 on form opposite last page.)

Excellent corrosion resistance permits many applications for impervious graphite . . .

high thermal conductivity also a factor in successful use

Impervious graphite, which is a graphitized form of carbon impregnated with a resin, is one of the most corrosion-resistant materials available. It can be successfully applied to most chemical services except those where high oxidizing media are present. Material's corrosion resistance, combined with its excellent thermal conductivity, has resulted in the use of impervious graphite for a wide variety of chemical processing equipment.

Immersion heaters made of impervious graphite can be used for maintaining a constant temperature in a batch operation. Overall heat transfer

Eliminate Corrosive Fumes!



Pyroflex-Constructed FUME WASHERS

Some of the gases scrubbed by these units contain the following:

HCl
Sulphur Dioxide
Chlorine
Benzol and HCl
Sulphuric Acid and Dust
Muriatic Acid and Chlorine

Every Pyroflex-constructed Fume Washer is individually engineered for maximum efficiency. In each case Knight engineers consider individual requirements, limitations, water consumption and fan power, as well as service conditions. The result is an engineered functional unit "tailored" to meet specific requirements. These units utilize Berl Saddles to insure peak performance.

Although individually engineered, Knight Fume Washers are relatively low in cost and economical in operation.

When writing for information, please include full details regarding service conditions.

Advantages

- No moving parts.
- Low pressure drop, low power costs.
- Wide operating range.
- No temperature limitations.
- Simple to operate, low maintenance.
- Corrosion resistant throughout.
- Wide range of shapes and capacities.
- Small floor space, low head room.

MAURICE A. KNIGHT

407 Kelly Ave., Akron 9, O.

Acid and Alkali-proof Chemical Equipment

When inquiring check 6435
opposite last page

CORROSION CONTROL

coefficients are approximately 80 and 100 Btu/hr/sq ft/°F for cooling and heating respectively.

Impervious graphite tube and shell heat exchangers have as standard design conditions, 75 psi tube side and 75 psi shell side pressures with a max operating temperature of 340°F. These exchangers are designed to allow tube side fluid to contact only impervious graphite, so that the corrosive solution is made to pass through the tubes. Although standard shell material is steel, shells of rubber-lined steel, stainless steel, Havg, or other materials can be furnished.

Most extensive use of impervious graphite cascade coolers is found in the production of HCl. Another application is in the dilution of sulfuric acid where a large amount of heat must be removed.

Cross-bore exchangers are designed for applications which are more rugged and for higher pressures. Standard design pressures are 150 psi for both tube and shell sides with a 340°F max operating temperature.

Impervious graphite cubic exchangers feature compactness and strength. Interconnectors are available so that single units up to 200 sq ft are available. Maximum design conditions are 150 psi and 340°F.

(From information furnished by George Sarvadi, Jr., Chemical Engineer, Falls Industries Inc., Solon, Ohio.)

(For more information on foregoing impervious graphite equipment and other products made from material contact Falls Industries Inc., Dept. CP, 31909 Aurora Rd., Solon, Ohio . . . or check 6436 on form opposite last page.)



"Our next corrosion problem is that pipe standing in the cor . . ."

Cartoon by Allan P. Kapkowski of the Bayway Refinery of Esso Standard Oil Co., Linden, N. J.

good insurance policy for Your Chemical Piping



Chemiseal®
EXPANSION JOINTS
FLEXIBLE COUPLINGS
made of duPont TEFLON

... now the "policy" of many Processing Plants

Protect costly piping, usually low in impact strength, against shock, vibration, expansion and contraction. Save their cost in pipe maintenance.

Chemically impervious, non-contaminating (TEFLON).

Eliminate slip-joints, gaskets, adaptors. Made to mate with any companion flanges.

Standard Sizes from 1/4" to 10" I.P.S. Ask your U. S. Gasket—Belmont Packing Distributor or write for Catalog EJ-1155.

UNITED STATES GASKET CO.
Camden 1, New Jersey

U.S. GASKET · BELMONT PACKING

When inquiring check 6437 opposite last page

How BEECH AIRCRAFT will save \$10,000 a year in Plating and Anodizing



Permutit Ion Exchangers also eliminate waste disposal problem... improve resistance to corrosion of anodized coatings.

Beech Aircraft encountered a tough chromate disposal problem. Dumped portions of Beech's 5% CrO_3 anodizing baths plus the rinse flow were sending more than 70 pounds of CrO_3 per day to waste. Immediate action was necessary!

Conventional treatment was no help... it takes up too much space, costs a lot. And raises the new problem of sludge disposal.

New Method Investigated! Beech engineers looked into the ion exchange process of chromate treat-

ment pioneered by Permutit. Here's what they got with Permutit's help.

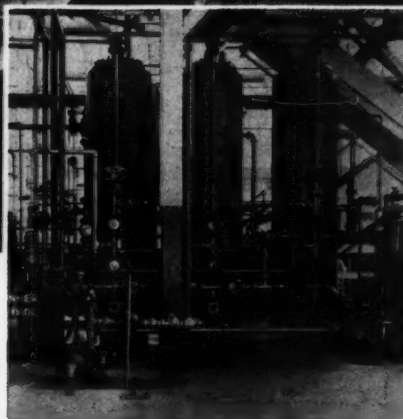
Chromic Acid Savings! Compact Permutit units (above) eliminate pollution. It is no longer necessary to dump any portion of the anodizing baths! The cation exchange unit removes contaminating dissolved aluminum, permits indefinite re-use of the chromic acid.

Improved Corrosion Resistance! The two anion exchange units recover up to 40 lbs. of CrO_3 per day from rinse water. All water is recir-

culated! It goes back to rinse tanks *mineral-free*, at the correct pH for best resistance to corrosion of the anodized coat.

It's easy to see how this Permutit installation will pay for itself in less than 2 years... and why you should let Permutit help you solve your waste disposal problem.

Write to The Permutit Company, Dept. CP-7, 330 West 42nd Street, New York 36, N. Y., or Permutit Company of Canada, Ltd., 207 Queen's Quay, Toronto 1, Ont.



ION EXCHANGE
WATER CONDITIONING
INDUSTRIAL WASTE TREATMENT

PERMUTIT

CORROSION

Heat resistance, stiffness advantages of extruded polyethylene tubing...

withstands higher pressures
does not stress-crack

Uses: For application in the chemical processing industries as fluid lines for various corrosive chemicals.

Features: High-modulus type polyethylene has higher heat resistance and is stiffer than regular polyethylene. It does not stress-crack.

Description: Polyethylene tubing is extruded to specifications, thus providing customer with best diameter and wall thickness for his particular job.

(Super-Aeroflex extruded polyethylene tubing is product of Anchor Plastics Co., Inc., Dept. CP, 36-36 36th St., Long Island City 6, N.Y. ... or check 6438 on form opposite last page.)

Coating can be applied over damp metal surfaces...

combines bituminous base with vehicle

Uses: Coating is particularly well adapted for use in areas where moisture is frequently present.

Features: Coating can be satisfactorily applied even over damp metal surfaces.

Description: Coating consists of a bituminous alkyd base combined with a penetrating vehicle. Coating has a black elastic surface that resists dampness, mild acids, grease, oil, and effects of extreme temperature changes.

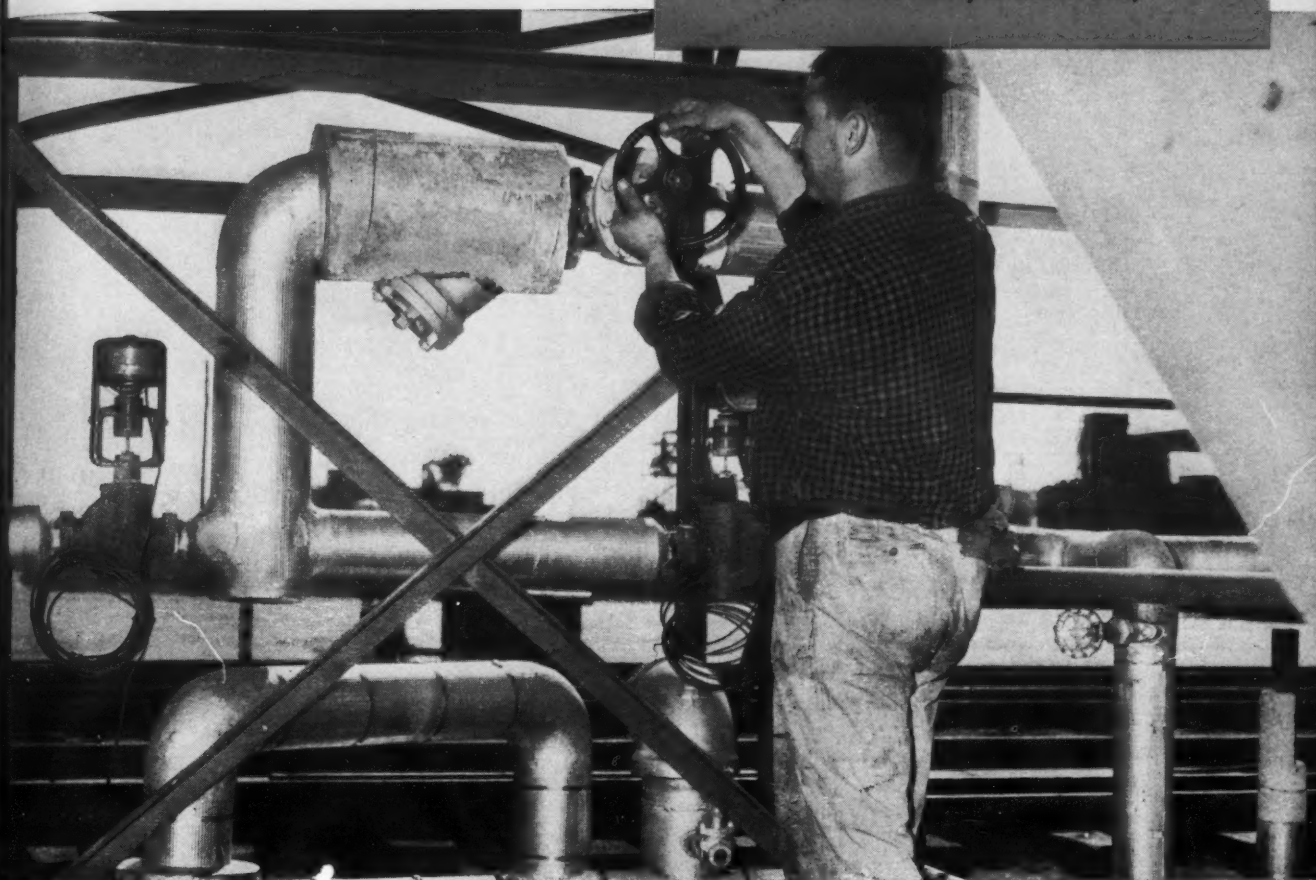
(Rustrem MS is product of Speco, Inc., Dept. CP, 7308 Associate Ave., Cleveland 9, Ohio. Check 6439 on form opp. last p.)

For more information on product at left, specify 6440 ... see information request blank opposite last page.

CHEMICAL PROCESSING

INTERESTING FACTS ON VALVE PERFORMANCE

(from a case history in Crane's files)



His job is to wash tank cars . . . not to contaminate them

Even a good washer can contaminate a product tank car unknowingly—it all depends on the valves in the washing system.

But that isn't happening at the Memphis emulsifiers plant of the Atlas Powder Co. as shown above.

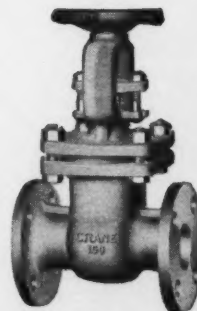
Here, Crane 18-8 SMO stainless steel valves are preventing corrosion and resultant iron pickup from getting into aluminum or stainless steel cars in washing. Such impurities could mean a lot of spoiled products when the cars are loaded.

After more than a year's service on hot detergent solution, the Crane alloy valves

show no corrosive effects, and there's no record of damage from contaminants. The valves continue giving positive flow control with no maintenance whatever.

New Crane alloy valves are helping all types of process industries with better flow control, corrosion resistance, and freedom from contamination at low cost. These valves offer many improved service features that can't be duplicated in other makes.

You'll make a sounder investment in alloy valves by knowing the facts on Crane quality. Contact your local Crane Representative or write to address below.



CRANE VALVES & FITTINGS
PIPE • KITCHENS • PLUMBING • HEATING

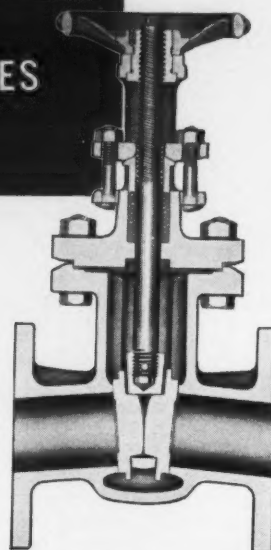
More Facts
on Alloy Valves—
See Over

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving all Areas

CORROSION MEETS ITS MATCH in these NEW CRANE ALLOY VALVES

in CRANE 18-8 SMO and Craneloy 20

GATES



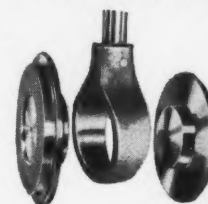
Cross section,
18-8 SMO or
Craneloy 20
Flanged ends,
½ to 12 in.
Screwed ends,
½ to 2 in.

It's a fact! These valves will help you combat corrosion in process piping effectively and economically. They're Crane's answer to your need for top-quality stainless steel valves at a competitive price. They give you new improved features for better flow control and longer valve life. You can choose from a complete line of gate, globe and angle patterns, and a companion line of swing checks. All patterns are available in a choice of two alloys—Crane Type 316 stainless, and Crane high-nickel, high-chromium Craneloy 20.

Free-to-Rotate Split-Wedge Disc in Gate Valves

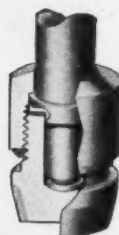
One outstanding feature of these gate valves is the Crane-patented split-wedge seating design. The trunnion-design disc halves are mounted in a carrier pinned to the stem. The discs are free to rotate within their guides. On closure, the convex back surfaces of the discs, bearing against each other, transmit a uniform seating load around the entire seating surface.

Free movement of the discs, plus uniform seating and unseating loads, effectively minimizes galling and seizing at seating surfaces, reduces wear, and assures smooth operation under all conditions. An integral flange on each disc bears in guide slots in the body. Wear on seating surfaces is avoided.



Trunnion-back split-wedge discs with carrier combine the advantages of free rotation with uniform seat load pressure.

Free Swivel Disc in Globe Valves

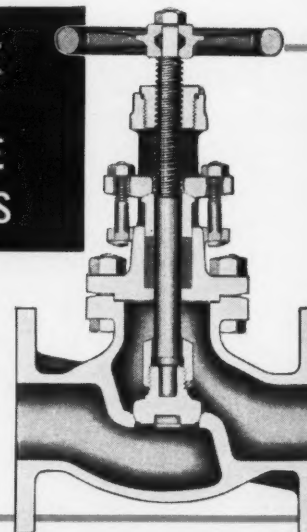


Note long engagement with stem for positive, accurate guiding of disc to seat.

In globe and angle patterns, Crane protects these valves against undue seating damage and wear with a new type disc-stem connection. It gives the disc complete freedom to swivel, yet has minimum radial clearances plus elimination of axial clearances to minimize vibration under high velocity flow. By placing seating load closer to seats, it assures easy, accurate closure every time.

The disc of modified plug-type design incorporates the advantages of both narrow ball-to-flat seating, and the greater resistance to damage, erosion or cutting characteristic of the wider area plug-type disc. It permits fine control in flow regulation.

GLOBE AND ANGLE VALVES



Cross section, globe
18-8 SMO or
Craneloy 20
With flanged ends,
½ to 6 in.
With screwed ends,
½ to 2 in.

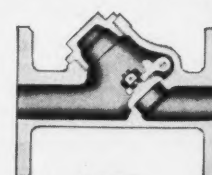
THIS CATALOG IS YOURS



...for the asking. It gives complete selection and specification data on new Crane corrosion-resistant alloy valves, with suggested applications. It can help you cut costs of corrosive fluid handling. Ask your local Crane Representative for Circular AD-2080, or write to Crane Co., Chicago 5.

COMPANION SWING CHECK VALVES

These checks are also supplied in both materials—Crane 18-8 SMO and Craneloy 20. Internal design in all patterns assures full and easy flow-through, with positive shut-off against reverse flow. They're compact, easy to maintain. Straightway pattern with flanged ends is made in 2½- to 6-in. sizes; the Y-Pattern, with flanged or screwed ends, comes in ½- to 2-in. sizes.



Y-Pattern
cross section

CORROSION CONTROL

Molten tin and chlorine at 600°F not too tough for silicon carbide . . .

refractory surpasses several other materials, with no contamination

Problem: Metal bubbler tubes, with non-metallic nozzle outlets at first gave acceptable service but later proved unsatisfactory in a corrosion application at a large eastern metals company. A number of other metals were tried with service life ranging from a few hours to, at best, several weeks.



Silicon carbide bubbler tube used in tin chloride manufacturing process

In making tin chloride, the company introduces chlorine into a bath of molten tin at about 600°F. Gas is evolved through a bubbler tube placed parallel and close to the tank bottom, connected by means of a goose neck to a vertical pipe leading from chlorine storage vessel.

Solution: Plant turned to a silicon-nitride-bonded silicon carbide bubbler tube. This material is made from silicon carbide bonded in situ with silicon nitride.

This refractory has exceptional corrosion resistance and a modulus of rupture of 7000 psi at 1832°F. Product has a compressive strength of 20,000 psi and a tensile strength of 3000 to 3500 psi, both figures being determined at 68°F. Material can be made into intricate shapes of relatively thin section with internal and external threads.

Results: Initial results with the silicon carbide bubbler at the metals company surpassed those obtained from other materials with no contamination of the molten metal being observed. Consideration is being given to using a goose neck and vertical pipe section made from silicon carbide.

(Refrax® Silicon-nitride-bonded silicon carbide is product of the Refractories Div., Carborundum Co., Dept. CP, Perth Amboy, N.J. . . . or for more information reader may simply check 6441 on the convenient Reader Service slip which is located opposite last page.)

For more information on product at left, specify 6442 . . . see information request blank opposite last page.

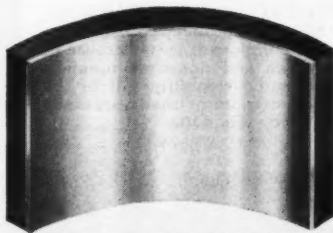
Clad steel will give us the same protection and long equipment life as solid high alloy!

... at savings up to 50% in material costs!



Clad steel demonstration unit recently featured at the Nat'l Assoc. of Corrosion Engineers show.

LOOK AT THE RECORD!



SEE FOR YOURSELF!

ECONOMY—high-alloy layer assures corrosion resistance, long equipment life.
STRUCTURAL STABILITY—low-cost backing steel provides strength and rigidity.
DESIGN FREEDOM—integral bond allows design and fabrication of shapes to meet process and space needs.

. . . of growing applications of clad steel throughout the chemical and petrochemical industries.

In tanks, pressure vessels and other vital equipment, clad steel can be found wherever corrosion, abrasion or product contamination are problems. Why? Because economical clad steel delivers the benefits of solid high alloy . . . at savings in material costs up to 50%!

Add to this, clad's easy maintenance—very little stays long on those smooth, high alloy surfaces that a quick flush with water can't remove! The permanent, integral bond between cladding and backing steel eliminates seepage

and crevice corrosion—makes modification simple. Walls can be cut, flanges or pipes welded on quickly and easily.

And only Lukens offers a selection of 16 cladding and 11 backing metals—giving you practically an unlimited selection of cladding and backing combinations to meet any conceivable need.

For more information consult your equipment builders or write to Manager, Marketing Service, Lukens Steel Company, 843 Lukens Building, Coatesville, Pennsylvania.

We'll show you in detail just why we say clad steel is the ideal material for long range economy.

LUKENS CLAD STEELS

STAINLESS-CLAD • NICKEL-CLAD • INCONEL-CLAD • MONEL-CLAD

Producers of the Widest Range of Types and Sizes of Clad Steel Plates and Heads Available Anywhere

When inquiring check 6443 opposite last page

CORROSION CONTROL

Four corrosion-resistant aluminum coatings

An epoxy aluminum paint that needs no primer is one of four corrosion-resistant coatings described in two recently issued bulletins of two pages each. This coating of the same type is formulated so it has unusually good resistance to abrasion as well as resistance to corrosion.

Second bulletin describes three other types of aluminum coatings, each of which is designed for a particular application.

Bulletins on aluminum coatings are issued by Industrial Finishes Information Service, Cook Paint and Varnish Co., Dept. CP, PO Box 389, Kansas City 41, Mo. When inquiring specify 6444 on form opposite last page.

Double protection is provided with sprayed-metal coatings impregnated with plastic . . .

variety of combinations of such systems offers economical corrosion control

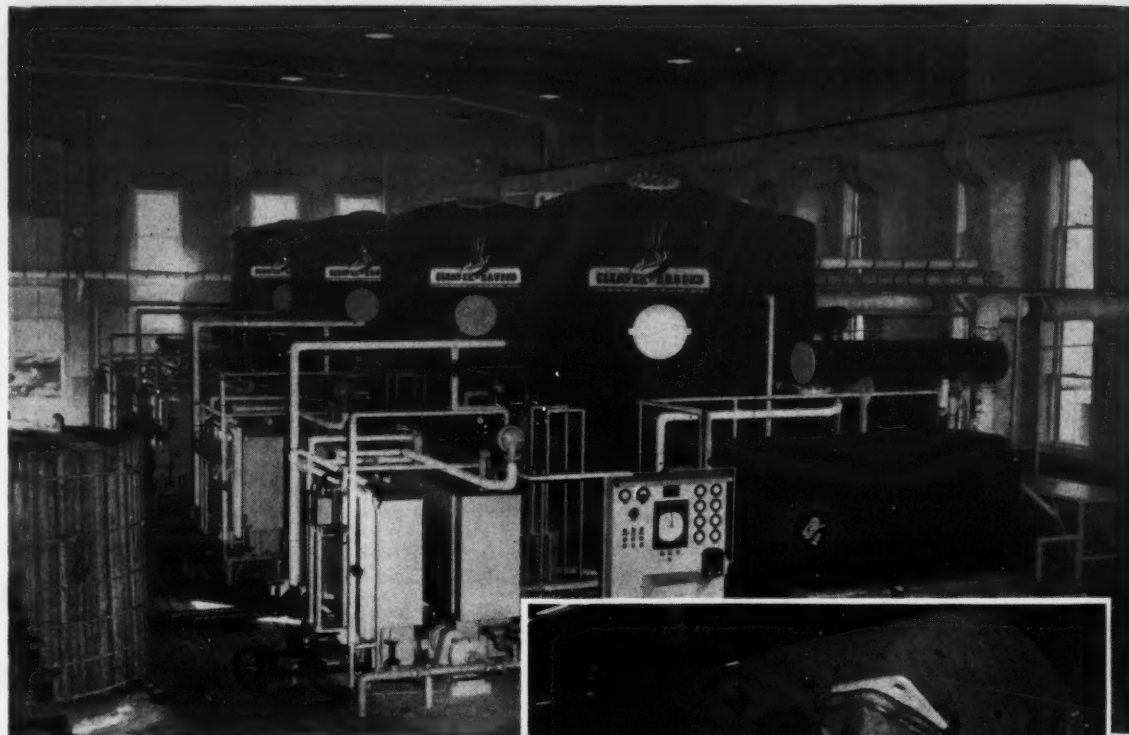
Recently developed system for lining tanks, which consists of sprayed-metal coating impregnated with plastic, offers the user double protection from corrosion. Resistance to corrosives is furnished by the base metal coating as well as by the top plastic coating. Also, many different types of metals may be used such as nickel, Monel, Inconel, or stainless steel. Adding to this the many different types of corrosion-resistant plastic that can be used, the user can select the best combination of sprayed metal and plastic for his particular application.



These chemical processing tanks have been lined with sprayed-metal impregnated with .008 to .010" of Epon

A sprayed-metal underbase of nickel or stainless steel may be applied with a suitable plastic impregnant for approximately one-half the cost of a competitive type of lining. Many large jobs have been done with sprayed nickel underbase and Epon-phenolic sealer. One typical application of this coating system has been on cast iron filter plates and frames. Some recent work includes sprayed

World's



BATTERY OF CLEAVER-BROOKS EVAPORATORS IN ACTION—Revere Silicon Bronze was chosen for these evaporators and their component parts because of its high corrosion resistance and non-contamination properties, great strength and weldability. All of the components, as well as the 4 evaporator shells, are made of Revere Silicon Bronze Alloy No. 420.



ONE OF THE 4 EVAPORATOR SHELLS made of Revere Silicon Bronze, fabricated and installed by CLEAVER-BROOKS MFG. CORP., Waukesha, Wisconsin.

EIGHT TUBE SHEETS LIKE THESE were used in the Bermuda installation . . . 2 per evaporator. Each tube sheet, made of Revere Silicon Bronze, is 86" in diameter, 1 1/4" thick and weighed approximately 1,360 lbs. after drilling.

Largest

VAPOR-COMPRESSION SEA WATER DISTILLATION PLANT

Made and installed by CLEAVER-BROOKS
... Vital distillation units fabricated from
REVERE SILICON BRONZE

This plant installed at the Kindley Air Force Base in Bermuda has a total daily capacity of 200,000 gallons and eliminates the dependence of the Base on rainfall or shipment of water by tankers.

Distilled water is produced in the ratio of 300 lbs. to each pound of Diesel fuel. Total costs are estimated at \$1.25 per thousand gallons of distilled water. Nearly every component part made by Cleaver-Brooks is about twice the size of its largest previous counterpart. For example, the evaporators are 16½ feet high. Each, with its component parts, weighs approximately 40,000 lbs., the empty Revere Silicon Bronze shell alone accounting for 28,000 lbs.

There is an interesting story behind the development and manufacture of this equipment. The four huge pressure vessels had to be fabricated of Revere Silicon Bronze Alloy No. 420. Knowing Revere's wide experience in welding copper-base alloys, Cleaver-Brooks called in a Technical Advisor, and gave him a complete set of blue-

prints of the vessels, with a request for suggestions regarding joint design and welding techniques. He in turn consulted the Welding Section of the Revere Research Department. Their recommendations were adopted, and the customer reported that the original estimate of welding time had been cut considerably, reducing production costs correspondingly.

The Revere Technical Advisory Service is glad to collaborate on problems involving the specification and fabrication of copper and copper-base alloys, and aluminum alloys. See the nearest Revere Sales Office.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.



THE STEAM SEPARATORS are identified by their conical tops and directional vanes. They are of the cyclone type, which is a patented feature of CLEAVER-BROOKS evaporators, and remove entrained water from the steam, thus preventing contamination of the fresh water coming from this unit. The result is an extremely high purity of the fresh water product.

The rectangular objects at rear of photograph are the "Downcomers" which bring water down from the top of the steam separator. The tubes in left foreground are "Hotwells," which receive the distilled water discharge from the evaporator shell.



When inquiring check 6445 opposite last page

CORROSION CONTROL

Monel impregnated with Kel-F. Such coating systems have been used in tank lining interiors which are subject to severe corrosion. Air-dried vinyls have been used over sprayed zinc or aluminum underbases. Many advantages seem to be in the offing for using sprayed metal and air-dried systems for all types of bulk handling equipment.

(For more information on sprayed-metal coatings impregnated with plastic contact Metal-Cladding, Inc., Dept. CP, North Tonawanda, N.Y. . . . or check 6446 on form opposite last page.)

Discoloration of paper prevented through use of PVC piping for deionized water . . .

system employing injection molded fittings resists pressure of 50 psi

Piping and fittings of unplasticized polyvinyl chloride are used to advantage by the National Cash Register Co., Dayton, Ohio, in the production of NCR paper. This is a paper that eliminates carbons in making duplicate copies of invoices, statements, and other written records. Corrosion-resistant PVC piping, which ranges from 1 through 1½", carries deionized water at room temperature and total head pressure of 50 psi. Injection molded fittings of PVC are employed in making directional changes.



This deionizer at National Cash Register Co. is served by pipe and fittings made of polyvinyl chloride

Salts are removed from process water by the use of ion exchange resins. This prevents discoloration of the paper and is part of the company's quality control program. Purity of the water is maintained by use of the plastic piping system.

(PVC Injection Molded Fittings are product of Tube Turns Plastics, Inc., Dept. CP, 2929 Magazine St., Louisville 11, Ky. Check 6447 opposite last page.)

COROCRETE

CORROSION-PROOF

FLOOR
SURFACING

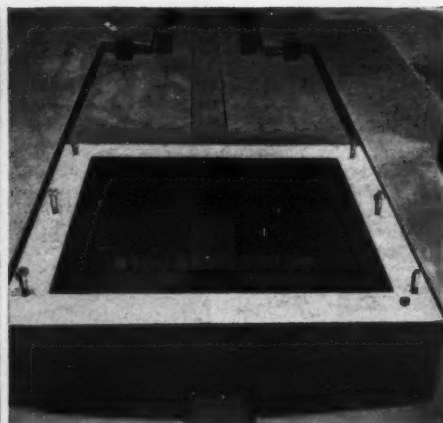


PROVIDES GREATER PROTECTION
AGAINST ACIDS AND ALKALIES

COROCRETE is 4 times stronger than concrete ... it is resistant to abrasion ... sets up faster than concrete ... resists impact ... provides positive protection against acids, alkalis and solvents ... and COROCRETE costs less than acid-proof brick.

Here is a floor surfacing material that has been developed to meet virtually all of the conditions found in chemical and food processing, plating and metal working industries.

COROCRETE will give you greater protection ... save you dollars ... and last longer. Use the convenient coupon to obtain more information or a sample of COROCRETE. Write today.



Quickly and easily applied over existing concrete surfaces, COROCRETE handles like cement topping (1/4 to 1/2-inch thickness).



THE CEILCOTE CO., Inc.

Corrosion Proof Material and Construction

4834 Ridge Road • Cleveland 9, Ohio

The Ceilcote Co., Inc.
4834 Ridge Road • Cleveland 9, Ohio
Check one or both:
☐ Please send me a copy of the Brochure
☐ Please send me a sample of COROCRETE

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

When inquiring check 6448 opposite last page

corrosion control

Handling 55 gal/min of corrosive phosphoric acid at Westvaco, vertical pressure-leaf unit gives —

*highest filtration throughput
per dollar of investment*

GORDON WEYERMULLER, Associate Editor
With JOSEPH MATULIS, Processing Engineer
Westvaco Mineral Products Division
Food Machinery and Chemical Corporation
Lawrence, Kansas

Problem: A filter that would satisfactorily handle corrosive phosphoric acid with maximum operating economy was required at Westvaco plant near Lawrence, Kansas. Arsenic trisulfide had to be removed from the product so that a good clear

filtrate was obtained.

Solution: After investigating a number of different types of filters, a pilot model of a vertical pressure-leaf filter, constructed of stainless steel, was placed in service. After the small unit was shown to be satisfactory, a larger plant-size filter of the same type was placed in operation in January 1955.

Unit usually filters phosphoric acid of 75% strength although it has handled as high as 85%.



After filtration cycle is completed, cover is removed, and filter cake is washed from leaves. Precoat tank is at right

CP Staff Photo

Acid varies in temperature from 40° to 60°C. Maximum working pressure of material entering unit is 65 psi. Arsenic trisulfide is removed from the acid, using a precoat of diatomaceous earth filter aid.

Filter is a standard pressure-leaf unit with 93 sq ft filtration area. Unit essentially consists of a closed pressure vessel, containing a series of vertical, double-faced filter leaves. An individual leaf consists of two layers of fine mesh stainless steel wire cloth separated by a coarse mesh drainage wire. Filter aid holds back the solids. Wire cloth merely supports the filter aid.

In operation, a precoat layer of diatomaceous earth is first established on the leaves. Solution to be filtered is pumped into unit through bottom of vessel.

After filtration, liquid flows through drainage member on inside of filter leaves to manifold and out the side of unit. When filtration cycle is completed, pump is stopped, filter emptied, and cake removed from leaves by washing with water from hose.

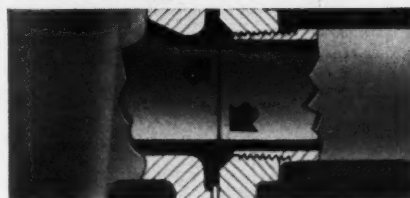
Results: Operating at an average rate of 55 gal/min, filter has shown a greater throughput per dollar of investment than the other units that were considered, in view of the excellent performance of the present unit and available data. No maintenance has been necessary on the filter in spite of handling the corrosive phosphoric acid for more than a year. A good clear product is obtained for the commercial grade of the acid. A food grade of phosphoric is also produced. In regular production, 50,000 gal of acid has been handled before it was necessary to clean filter.

(Pressure-leaf filter is product of Niagara Filters Div., American Machine and Metals, Inc., Dept. CP, East Moline, Ill. . . or for more information check 6449 on form which is located opposite last page.)

On chromium-nickel-manganese austenitic stainless steels

Information on how variations in chromium and nickel contents affect corrosion resistance is included in eight-page publication on the austenitic stainless steels. Compositions, typical applications, mechanical properties, and elevated temperature properties are included in a discussion of the chromium-nickel-manganese steels.

Bul TH2 is issued by Allegheny Ludlum Steel Corp., Dept. CP, Oliver Building, Pittsburgh 22, Pa. When inquiring specify 6450 on form opposite last page.



Saran lined pipe to saran valves. Notice the saran lining is continuous.

You can see why Saran Lined Pipe eliminates costly downtime

**Corrosive liquids can't touch the strong steel pipe
... even at fittings ... it's lined continuously with thick, durable saran**

Saran lined pipe, fittings and valves convey acids, alkalis and many other corrosive liquids for years with trouble-free performance. One chemical manufacturer reports a saran lined pipe installation used intermittently for ten years with no corrosion shutdowns. Similar reports came from the petroleum waste, pulp and paper, metal finishing and food processing industries.

Saran lined pipe is made of corrosion-resistant saran swaged into rigid steel pipe. Saran lined pipe, fittings and

valves form snug, tight-fitting, leak-proof joints ... is available for working pressures up to 150 psi. Valves and fittings are also available in steel for working pressures to 300 psi. This modern piping is easily installed, too. It can be cut and threaded in the field with available pipe fitters' tools. Its rigidity means few supporting structures are needed. For further information on saran lined pipe, fittings and valves, send in the coupon on the left. THE DOW CHEMICAL COMPANY, Midland, Michigan.

Saran Lined Pipe Company
2415 Burdette Avenue
Ferndale, Michigan
Dept. SP6288

Please send me information on saran lined pipe, fittings and valves.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

Saran Lined Pipe is Manufactured by
The Dow Chemical Company, Midland, Michigan

you can depend on **DOW PLASTICS**

DOW

When inquiring check 6451 opposite last page

TANTALUM...

We know its
value
We use it
Sparingly

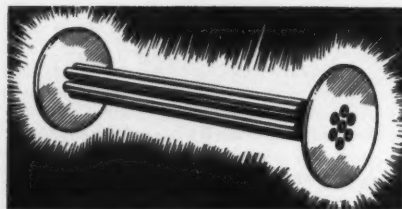
We make it a rule not to recommend tantalum unless it is the only right material for a particular process. And when we design tantalum equipment, we use it sparingly—an easy task in most instances because tantalum's strength and excellent heat transfer qualities make for minimum bulk. Where other materials of construction can be used in conjunction with tantalum, we specify them.

All this is an effort—and so far, it has been a successful effort—to lower processing costs. The benefits of tantalum's complete immunity (not mere resistance) to most corrosive reagents are now obtainable at final operating costs far less than the costs of processing without tantalum.

Why not discuss your corrosion problem with Fansteel engineers for a practical, unbiased recommendation? There is no obligation, and consultations are kept in strictest confidence.

USE TANTALUM WITH ECONOMY for most acid solutions and corrosive gases or vapors.

Not recommended for HF, strong alkalis or substances containing free SO₃.



Write for free **TANTALUM** booklet today!

FANSTEEL METALLURGICAL CORPORATION
Chemical Equipment Division
NORTH CHICAGO, ILLINOIS, U.S.A.

G561A

When inquiring check 6452 opposite last page

CORROSION CONTROL

Quick changes in pilot plant made possible with sturdy, chemical-resistant hose . . .

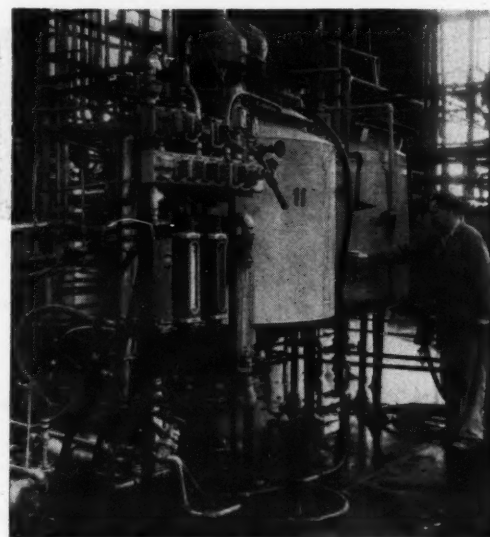
saves \$600 per year, lasts four times as long as former hoses

Problem: Flexibility is the keyword in the pilot plant section of Bristol Laboratories, Syracuse, N.Y., a division of Bristol-Myers, pharmaceutical manufacturers. Development of antibiotics and other drug products requires that changes in pilot plant setups be made rapidly and easily. Flow patterns must be quickly changed, and different equipment placed in or out of service in as short a time as possible.

Hoses are used for making the connections that must be changed often. However, the first hoses that were tried kinked excessively on short-radius bends, and failed when vacuum was applied. A hose that would not kink and which could handle both suction and discharge — and still be inert to chemicals — was needed.

Solution: About two years ago, a hard wall, wire-woven, oil-resistant hose, identified as 24WW, was tried. This hose has a one inch inside diameter and is equipped with couplings.

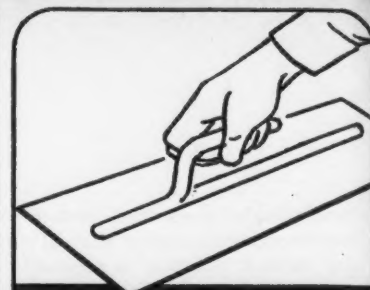
The wall of the hose is 1/4-inch thick and consists of an outer layer of synthetic rubber, especially com-



Flexibility of pilot plant is made possible by use of sturdy suction and discharge hose for chemicals

pounded to resist oily environments and weathering. Reinforcement is of spirally-wound spring steel wire interwoven with strong cotton cords. Inside layer of hose is also made of synthetic rubber and is extremely inert to oil and mild corrosives.

Results: Hose recently placed in service bends on tight radii without kinking and does not collapse



Trowel on CORROSION RESISTANT FLOORS

**with your own
plant labor**

New Chem-Top floor surfacing compound gives you a dense, non-porous, rock-hard floor that withstands impact, wear and corrosive action. Chem-Top Floors outwear other acid-proof floors, cost much less.

Chem-Top Floors are chemically inert, won't react to acids, salts, oils, alkalis or grease. Spilled industrial chemicals, brine, inks, greases or dyes can be wiped up without even a stain. Chem-Top is excellent, too, for surfacing drains, tank linings or walls.

Four times tougher than concrete, Chem-Top has a compressive strength of 40,000 to 50,000 lbs. PSI as against 10,000 to 14,000 for the best concrete.

Plant labor can apply. Prepare floor according to directions, then trowel on a layer 1/8" thick. You'll get a smooth, burnished floor that is slip resistant and easy to keep sanitary. Added floor height around drains, sills and equipment is negligible.



For full details
Write Dept. CP-7
for folder

**THE GARLAND
COMPANY**
Cleveland 5, Ohio

When inquiring check 6453
opposite last page

CHEMICAL PROCESSING

CORROSION CONTROL

when high vacuums are applied. It withstands chemical action of the experimental batches, and does not contaminate product in any way. Hose lasts about four times longer than any previously used in the pilot plant, according to Mr. Carl Mt. Pleasant, general foreman of the pilot plant section. Savings in hose replacement costs amount to about \$600 annually.

(24W/W hose is a product of The Gates Rubber Co., Dept. CP, 999 S. Broadway, Denver 17, Colorado . . . or for more information check 6454 on form opposite last page.)

Two-coat protective coating has total thickness of 12 mils . . .

fewer coats required reduce labor costs for equivalent thickness

Uses: For severe corrosive environments.

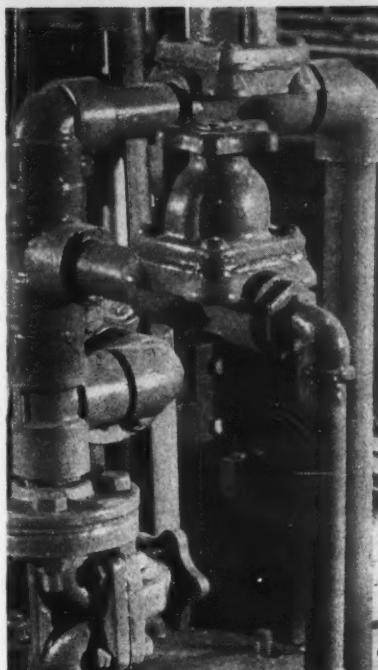
Features: Two-coat system gives a total thickness of 12 mils. Fewer coats, with greater total film thickness, give lower labor costs compared to multiple coat systems.

Description: Modified phenolic coating is catalytically set, having 86% solids content. Resulting film is dense and non-porous. Coverage is 20 sq ft per gal. Coating has outstanding resistance to splash, spillage, and fumes of most acids, alkalis, and solvents.

(Phenoline 305 coating is product of Carboline Co., div. Mullins Non-Ferrous Castings Corp., Dept. CP, 331 Thornton Ave., St. Louis 19, Mo. . . . or for more information check 6455 on form opposite last page.)



"When did you first discover you had a valence of plus two?"



**ALPHA
PLASTICS INC.**

NEWEST Answer to Positive Corrosion Control ... at lower, overall cost!

ALPHA PVC PIPE and FITTINGS

an engineered product-quality controlled

Corrosion causes serious problems in line pipe installations . . . unless PVC is on the job. Frequent maintenance difficulties, excessive "down-time" reduce full efficiency of equipment. Why put up with it? You can get the "right" pipe in the right places:

ALPHA 101 Normal Impact Unplasticized Straight PVC
OR

ALPHA 102 High Impact Unplasticized Modified PVC

Tested and recommended for 186 Corrosives!

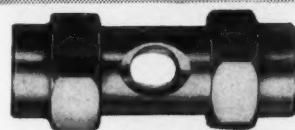
- In 1/2" to 4" Sizes; PVC Pipe and Fittings
- Defies corrosion-inside and out
- Schedules 40 and 80; either socket or threaded fittings
- Easy to assemble; non-flammable

Get the facts how Alpha PVC Pipe fits into your operation; solves many problems. Write for detailed literature describing applications, plus dimension drawings and fittings chart.

OKNER PARKWAY, LIVINGSTON, NEW JERSEY

When inquiring check 6456 opposite last page

SEE INSIDE YOUR FLUID LINES WITH THE NEW LIQUID EYE POSITIVE SEALING INDICATORS



Illustrated: 3000 Series I.P.S.

are on
the job!

- Extra thick tubular Pyrex sight glass — double pressure sealed at sides and ends with Teflon or Neoprene gaskets (Teflon ideal where high temperatures up to 450° F. are a problem).
- Each unit guaranteed to 600 psi.
- Unrestricted full line flow.
- Precision made in cadmium plated steel or in brass (also available with stainless steel springs for use with corrosive fluids).
- Wide variety of applications.

Write today for Catalog D-35 covering the Allin line. Standard sizes 3/4", 1" and 1 1/4" I.P.S., with larger sizes available. Special units can be made to your exact specifications.



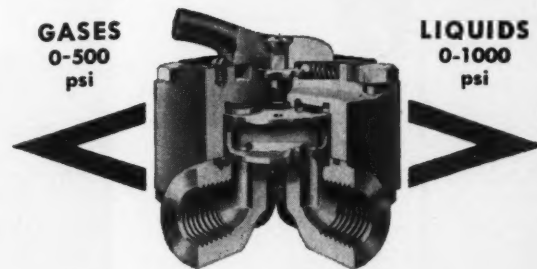
ALLIN MANUFACTURING CO.
410 N. Hermitage Ave. • Chicago 22, Illinois
Over 1,000,000 Liquid Eyes Sold to Date!

When inquiring check 6457 opposite last page

REPUBLIC New SEAL-TITE VALVES PRESSURE BALANCED

GASES
0-500
psi

LIQUIDS
0-1000
psi



- 1/4" to 1" FPT
- -65° to 160°F
- 2, 3, 4-way
- Turning ease

- Zero leakage
- Increasing pressure tightens seals.
- Positive flow control

Ask for Catalog No. 356

Distributors in principal cities coast to coast



RM

REPUBLIC MANUFACTURING CO.

15655 BROOKPARK ROAD • CLEVELAND 11, OHIO

When inquiring check 6458 opposite last page

CORROSION

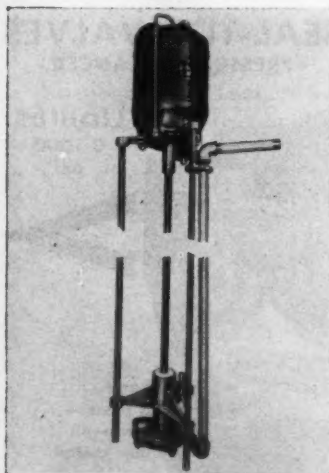
Covers sodium nitrite for corrosion control

Quick rundown on the use of sodium nitrite as a corrosion inhibitor is given in two-page publication. A number of successful applications of the material are described. Publication on sodium nitrite is issued by Solvay Process Div., Allied Chemical & Dye Corp., Dept. CP, 61 Broadway, New York 6, N. Y. When inquiring specify 6459 on form opposite last page.

Teflon bearing on pump eliminates need for lubrication . . .

portable submersible mount
available for unit

Need for external lubrication is eliminated by use of Teflon adjustable thrust and guide bearing in centrifugal pump. Fluid pumped acts as a lubricant since Teflon bearing is in rotational contact with a Teflon sleeve on pump shaft.



Pump can be easily moved in order to discharge vats or tanks at different locations

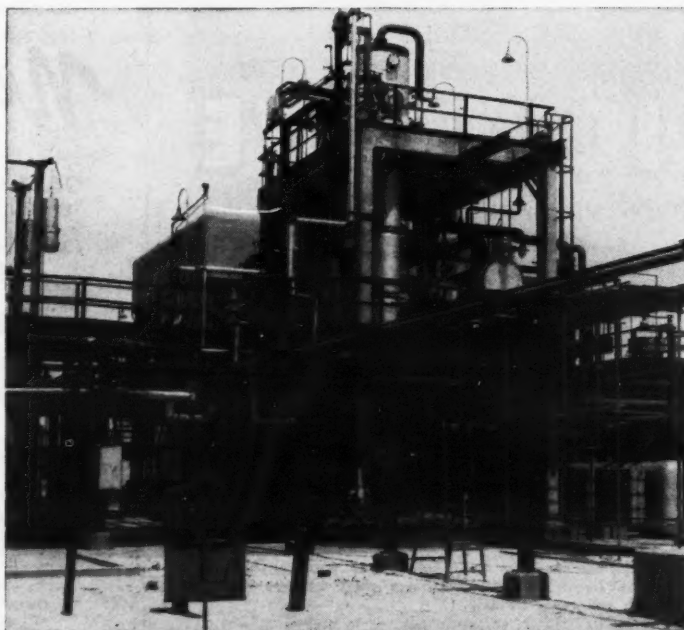
Mounting which permits submersible operation for pump has also been developed. Weighing less than 100 pounds, the entire unit is portable and can be readily moved by lift truck for discharging vats



Here are six of the many Stainless Steel pumps used in the distillation unit.

TAKE A TIP FROM ARMOUR—

use USS Stainless Steel to protect the color of your product



The pictures were taken at McCook, Illinois, at a Chemical Division plant of Armour and Company. Here, fatty acids and fatty chemical derivatives are produced from such raw materials as tallow, coconut oil and cotton seed oil.

All piping and most of the pumps are made from Stainless Steel. The fat splitter, distillation columns, dryer, distilling vessels, water cooler and reactor tubes are also made from Stainless; and there are countless other places where this valuable metal is used, too.

We talked to Robert J. Cotten, Assistant to the Master Mechanic, and he said, "If we used any other metal but Stainless Steel, it would discolor our end products—an intolerable situation for Armour and Company. But there's another point to consider, too. All of the Stainless we installed in 1949 is still in excellent condition. If we had used mild steel, we'd have replaced it 20 times by now."

Nothing can equal Stainless Steel in its combination of useful properties: corrosion resistance, no product contamination, cleanability and resistance to elevated temperatures. And when you buy, be sure of service tested quality—specify USS Stainless Steel.

In the solvent crystallization plant Stainless is used for heat exchangers, chiller filter and other equipment.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS



or tanks at different locations. Combination of Type 20 stainless steel construction with Teflon bearing permits usage in severe corrosive service.

Maximum particle size that can be handled in slurries is 1/16". Units can be furnished in capacities to 45 gpm and heads to 50 feet.

(Type 20 Alloy Centrifugal Pumps are product of Eco Engineering Co., Dept. CP, 12 New York Ave., Newark 1, N. J. . . . or check 6460 on form opposite last page.)

Assures adhesion of paint to shiny or smooth surfaces

Coating is announced which makes paint films adhere better to smooth surfaces such as galvanized sidings or aluminum sheets. Clear coating is based on a special synthetic resin. It can be applied by a brush or a spray.

(Metal Bond coating is product of The Wilbur & Williams Co., Dept. CP, 130 Lincoln St., Boston 35, Mass. . . . or check 6461 on form opposite last page.)



"Regular or filter tip?"

Cartoon by Robert P. Genovesi of The E. Horton & Son Co., Windsor Locks, Conn.

For more information on product at left, specify 6462 . . . see information request blank opposite last page.

The fat splitter is 65 feet high. It is lined with 7/64" Stainless Steel.

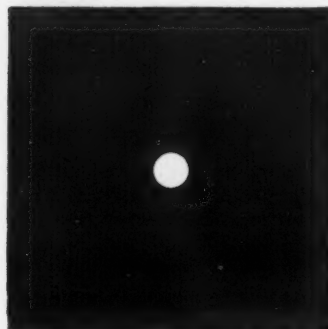
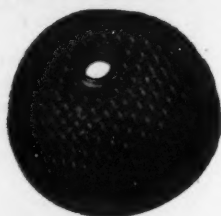
UNITED STATES STEEL

Anti-Corrosive WIRE CLOTH

- STAINLESS STEEL
- "NICHROME"
- "MONEL"
- PHOSPHOR BRONZE

for

- FILTER CLOTH
- SPECIAL PARTS
- STRAINERS
- SIEVES
- TRAPS
- SCREENS



Are you using wire cloth or wire cloth parts which must be corrosion resistant? Are the service conditions in your plant really tough? If you have a problem selecting the proper anti-corrosive alloy, Newark Wire Cloth may have the answer.

Available in all corrosion resistant metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse to extremely fine.

If you have a wire cloth problem involving corrosion, please tell us about it . . . we may have the answer.

NEWARK
for ACCURACY

A complete line of woven wire cloth and wire cloth parts in all malleable metals.

Send for Catalog 6

**Newark
Wire Cloth
COMPANY**

351 VERONA AVENUE • NEWARK 4, NEW JERSEY

When inquiring check 6463 opposite last page

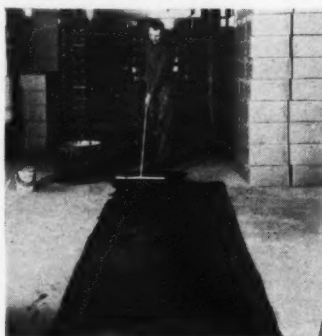
CORROSION

**Can walk on this coating
for concrete one hour
after application . . .**

material resistant to alkalis,
oil, gasoline

Uses: Coating is primarily for painting new concrete floors. However, it is suitable for other uses such as wood surfaces.

Features: Since product is completely alkali resistant, no pre-painting acid wash of surface is required. It can be used on new concrete. Coating is not affected by gasoline, oil, or kerosene. It



Long-handled floor brush permits fast application of paint

dries in 20 to 40 minutes. It is satisfactory to walk on coating one hour after application. It takes overnight, under good drying conditions, for the film to cure to a good, tough, wear-resistant surface.

Description: The vehicle in this paint is Acrypolyrene, which consists of a blend of latexes and suitable alkyd resin emulsions to give maximum adhesion properties and alkali resistance. Pigments used are light-fast. Curative agents are used to bring the vehicle to maximum toughness in a short time. Coating is available in six colors. It is non-flammable and free of toxic fumes. Coverage is 300 sq ft per gallon on first coat, and up to 600 sq ft per gallon on second coat.

(Luminall concrete paint is product of National Chemical & Manufacturing Co., Dept. CP, 3617 S. May St., Chicago 9, Ill. Check 6464 opposite last page.)

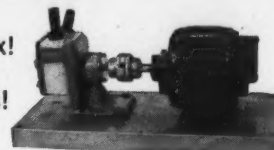
The Problem:

PUMPING FERRIC CHLORIDE

The Solution:

VANTON PLASTIC PUMP

No stuffing box!
No gasket!
No shaft seals!



A major manufacturer of electronic equipment faced the problem of transferring corrosive ferric chloride in the new Printed Circuit department to and from the etching machine, located 40 ft. from the pump unit. It was solved by using a Vanton pump, Model NX-90 (15 GPM) with Buna N body block and Natural Rubber "flex-i-liner". Since the Vanton operates equally well in either direction, a reversing switch on the motor made possible ready changes in the direction of flow.

When the problem involves corrosive or abrasive solutions or slurries, the seamless, self priming, no stuffing box Vanton is the answer.

Catalog 55 on request.



VANTON
PUMP & EQUIPMENT CORP.
201 Sweetland Ave. Hillside, N. J.

division of Cooper Alloy Corporation

When inquiring check 6465 opposite last page

Specify

KNOX

TOWER
PACKINGS

PORCELAIN



Save Time
and Money on

KNOX

Tower Packings

BERL SADDLE

- Uniform Quality
- Zero Porosity
- Iron Free
- High Strength
- Resists High Temperatures, Fumes, Vapors, Corrosion, Alkalies and Acids

- KNOX produces porcelain Tower Packings from same composition as is used for High Voltage Electrical Porcelain

Your Inquiry Will
Receive Prompt Attention



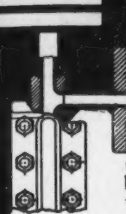
KNOX PORCELAIN CORP.
KNOXVILLE, TENNESSEE

When inquiring check 6466 opposite last page

CHEMICAL PROCESSING

How to Handle and Gage Corrosive Liquids

safely and accurately



You can handle and gage acids and other corrosive liquids safely and accurately with Jerguson Lined Gages. Corrosive materials can't harm these gages . . . for they are lined with natural and synthetic rubbers, lead, phenolic base compounds, Teflon, etc., or are made with chambers of Havel, Saran or various metal alloys . . . depending on your individual need.

Jerguson has a complete line of gages, valves and specialties for use in the observation of liquids and levels in the Chemical and Petrochemical Fields. Lined Gages are available in both reflex and transparent types . . . in a wide variety of connections and hook-ups.

Send for Drawing GD-431 . . . or send us your requirements.

JERGUSON

Gages and Valves
for the Observation
of Liquids and Levels

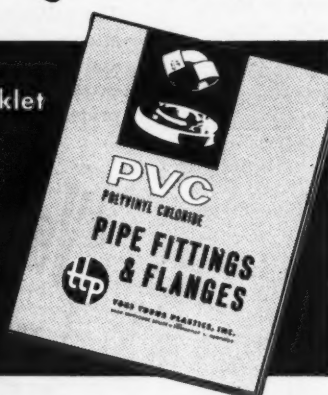
JERGUSON GAGE & VALVE COMPANY
100 Fellsway, Somerville 45, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.
In England: Jerguson Tress Gage & Valve Co. In France: Pétrole Service

When inquiring check 6467 opposite last page

Stop piping corrosion!

This new booklet
gives facts on
TUBE TURNS
PLASTICS
PVC
fittings



You can solve corrosion problems with unplasticized PVC piping — outlasts and costs far less than metal systems for handling many types of corrosive materials. New booklet gives properties and applications of PVC systems, describes PVC pipe fittings and flanges made by Tube Turns Plastics, Inc., the only source for injection molded PVC products. Produced by the exclusive Hendry process, these PVC fittings are considerably stronger than fittings made by conventional processes. Write Tube Turns Plastics, Inc., Dept. PA-7, 2929 Magazine Street, Louisville 11, Kentucky.



TUBE TURNS PLASTICS, INC.

Louisville 11, Kentucky

Call your TUBE TURNS PLASTICS' Distributor

When inquiring check 6468 opposite last page

JULY 1956

CORROSION

Hydrazine reduces corrosion in closed cooling system at chemical plant

Cleaner cooling surfaces are obtained, in addition to other advantages, through the use of hydrazine in a closed-circuit cooling system at a large chemical plant. Hydrazine is used here for treating the water cooling internal combustion engine-driven compressors. Hydrazine is added once per shift. Amount added is dependent on size of cooling system and amount of leakage. Residual hydrazine in system is maintained at approximately 0.1 ppm.

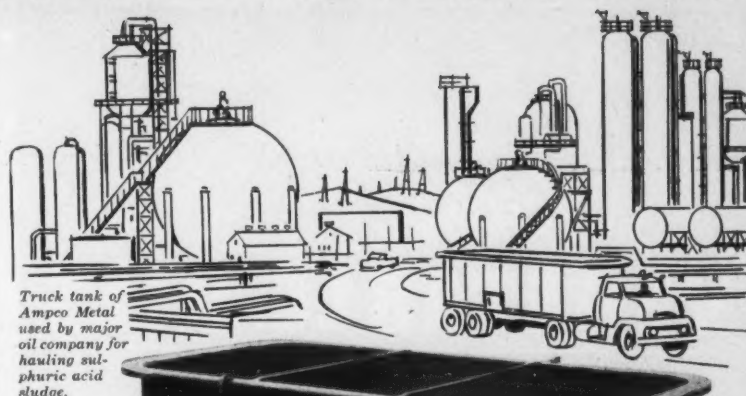
For example, in one installation, a cooling system of 450-gal capacity, circulating water at rate 350 gpm and having heat load of about 9,000,000 Btu/hr, requires about 1 oz per day of a 10% solution of N_2H_4 .

In first six months during which hydrazine was used, cooling surfaces were found to be much cleaner than they had been during former period of treatment with another chemical. Hydrazine protected cooling surfaces completely from corrosion. This also resulted in improved heat transfer.

Recent series of laboratory tests were made to determine efficiency of hydrazine as a corrosion inhibitor at comparatively low temperatures. Samples of a variety of metals were exposed at 150°F to flowing streams of untreated tap water and tap water treated with sufficient hydrazine to give a residual hydrazine content of about 1 ppm after reaction with the dissolved oxygen. The results of test are summarized as follows:

| Metal | Corrosion Rate, mils per year | |
|---------------|-------------------------------|------------------------|
| | Untreated Water | N_2H_4 Treated Water |
| Cast aluminum | 9.9 | 3.4 |
| Cast iron | 7.3 | 1.0 |
| Mild steel | 6.0 | 1.4 |
| Solder | 0.2 | nil |
| Copper | 0.4 | 0.2 |
| Brass | 1.3 | nil |

(Information courtesy of E. R. Woodward, Industrial Chemicals Div., Olin Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Maryland. Check 6469 opposite last page.)



Truck tank of Ampco Metal used by major oil company for hauling sulphuric acid sludge.



Handles 35% Solution of Hot Sulphuric Acid Sludge

Truck tank...made from Ampco Metal Grade 8 plate...resists corrosion

Ampco Metal resists corrosion, erosion, and cavitation-pitting caused by...

Boiling sulphuric acid (up to 50%)

Hot concentrated caustic solutions

Fatty acids

Hydrofluoric acids

Abrasive solids in suspension

Other problem liquids and abrasives

Ampco Metal has exceptional resistance to the destructive attack of many alkaline and acid media.

That's one reason why this aluminum-bronze alloy is used in fabrications like the truck tank shown here; in pipe, fittings, and other forms.

There are other reasons, also:

- (1) Ampco Grade 8 can be readily sheared, bent, formed, or deep drawn.
- (2) It is easy to weld with Ampco-Trode* by the metal-arc, carbon-arc, MIG or TIG processes.
- (3) It possesses high impact and fatigue strength.

You can get Ampco Metal in sheet, plate, extrusions, sand and centrifugal castings, pipe fittings, fasteners, tubing, pumps, valves, etc.

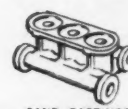
Ask your Ampco field engineer for further facts — or write us.

*Reg. U. S. Pat. Off.

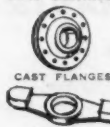


AMPCO METAL, INC.
Dept. CP-7, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif.

THE METAL WITHOUT AN EQUAL



SAND CASTINGS



CAST FLANGES

FORGINGS



CENTRIFUGAL CASTINGS



EXTRUSIONS



CAST PIPE FITTINGS



FABRICATIONS



SHEET AND PLATE



MACHINED PARTS

PR-24

When inquiring check 6470 opposite last page

Neither VEGETABLE OILS

Nor caustic solutions can harm VALDURA'S VALPON

HERE is the *perfect* protective finish for equipment and floors in all processing plants and extraction plants burdened with maintenance problems occasioned by oils of any type and caustic cleaning solutions. Valpon, a product of Valdura research, incorporates the marvelous Epon Resins discovered by Shell Chemical. It is not only invulnerable to all types of oils and caustic solutions but even displays remarkable resistance to acids and alkalis. It has been proved in use by large food processors, refineries and extraction plants.

If you'd like to know more about Valpon and other items in Valdura's complete line of specialized maintenance products, or if you'd like help with a particular problem, just state your wishes on your regular letterhead and mail to the address below. *Your inquiry will be treated as an invitation to provide service . . . not as a license to exert selling pressure!*



Available in suitable industrial colors and black and white.



VALDURA HEAVY DUTY PAINT DIVISION

AMERICAN-MARIETTA CO.
101 E. Ontario St., Chicago 11, Ill.

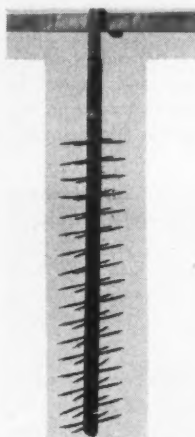
When inquiring check 6471 opposite last page

CORROSION CONTROL

Life of anodizing racks increased through use of titanium . . .

service life in sulfuric acid lengthened from two days to a year

Problem: Only two days service life was obtained from four-way anodizing rack used in an anodic oxide coating process for aluminum parts. Sulfuric acid used in process attacked and dissolved the metal used for the rack.



Titanium anodizing rack
resists H₂SO₄

Also, formerly anodic coating built up on the tips of rack which grasp the parts being coated. It was necessary to have extra labor, material, and equipment to remove this anodic coating from rack prior to next production cycle.

Solution: More than a year ago, an anodizing rack fabricated from titanium was placed in service.

Results: Useful life of anodizing rack has been increased to one year through the use of titanium. Excessive maintenance has been eliminated.

(For more information on titanium contact Mal-lary-Sharon Titanium Corp., Dept. CP, Niles, Ohio. . . or check 6472 opposite last page.)

Boiling caustic-salt slurries, 73 percent caustic solution handled by nickel valves . . .

caustic temperatures range from 80 to 300°F, with pressures up to 80 psi

Problem: Handling hot caustic, 80 to 300°F, at pressures up to 80 psi, was a tough valving job at Hooker Electrochemical Company's caustic soda-chlorine plant at Montague, Michigan. Caustic-salt slurry solution concentrations ranged from 10 to 50%. Caustic solution was 73%. Majority of units selected had to be installed on triple effect and 73% concentration evaporators.

Caustic is sold on low iron specifications so iron contamination had to be scrupulously avoided.

Solution: Some 220 valves with nickel bodies and Teflon packing were specified by Hooker's engineering department.

Results: Units have successfully handled boiling concentrated caustic and caustic-salt slurries in

The **VALDURA** name stands for a complete line of specialized industrial maintenance products designed to serve every type of American industry. Typical products are indicated below. Other Valdura Specifics and Exclusives will be identified in future ads. Watch for them! They can solve your toughest maintenance problems.



Val-Chem serves as the perfect primer for Valpon or any of the Valdura finishes incorporating chemical resistance. It provides speedier drying and a vastly superior bond.

Tank-White combines maximum resistance to weathering and industrial fumes, and an extra measure of gleaming, prideful beauty.



If you have a particular maintenance problem which is urgent just describe it on your regular letterhead and mail to the address below. Your inquiry will be treated as an invitation to provide service . . . not as a license to exert selling pressure!



VALDURA
HEAVY DUTY
PAINT DIVISION
AMERICAN-MARIETTA CO.
101 E. Ontario St., Chicago 11, Ill.

When inquiring check 6473
opposite last page

CHEMICAL PROCESSING

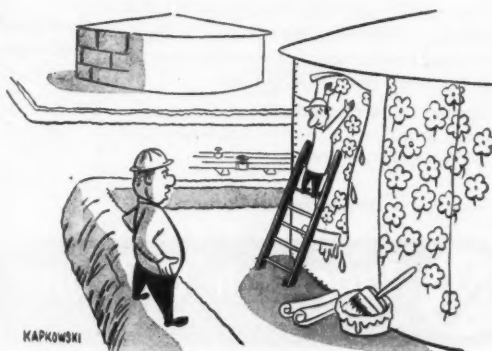


Slurry valves between first and second effect receivers of caustic concentration evaporators

all phases of soda-chlorine operation. No iron contamination has been experienced. It is expected that valves will give years of service even under extreme corrosive conditions to which they are subjected.

(Cast nickel valve bodies were supplied by International Nickel Company, Inc., Dept. CP, 67 Wall St., New York 5, N.Y. . . . or for more information check 6474 on form which is located opposite last page.)

(Valves were supplied by Wm. Powell Company, Dept. CP, 2503 Spring Grove Ave., Cincinnati 22, Ohio . . . or for more information check 6475 on the convenient Reader Service slip which is located opposite last page.)



"Painting only will be sufficient, Brown!"

Thanks to Allan Kapkowski, of the Bayway Refinery of Esso Standard Oil Co., Linden, N. J.



The Answer To a Tough Problem — They Bought **LaBours**

Handling resins and fatty acids at temperatures up to 520°F calls for pumps with real ability to stand up under punishment. That's why this picture from the Bay Minette, Alabama, plant of Newport Industries, Inc., shows six LaBour pumps.

These pumps have steam jacketed heads and water cooled seals and bearing brackets. The great advantage of having LaBours: you know they can be depended on for long trouble-free service. As this is

written these pumps have been on the job nearly two years.

Cost-conscious buyers know the real measure of pump economy is not the original price, but the service rendered per dollar of total cost for the life of the equipment. Because LaBour pumps minimize down-time and repair expense they welcome this realistic comparison. We'll be glad to supply some interesting facts at your request.

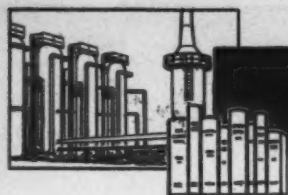
ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

LABOUR

THE LABOUR COMPANY, INC. • Elkhart, Indiana, U.S.A.



When inquiring check 6476 opposite last page



processing and engineering data

159a

CORROSION KEYS

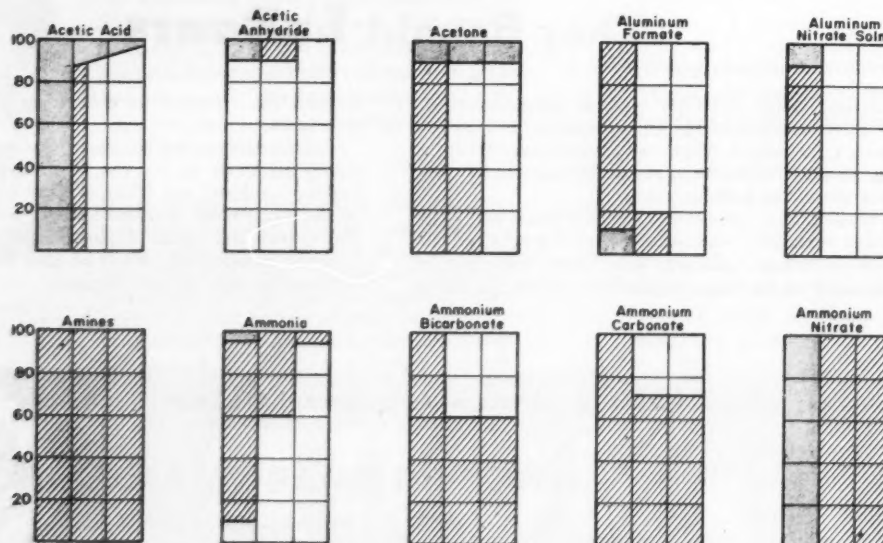
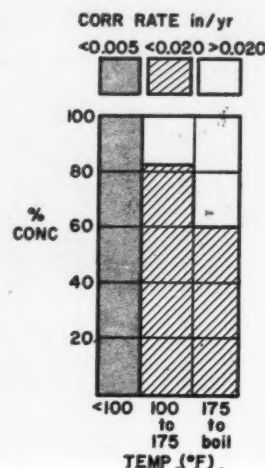
Aluminum

R. S. DALRYMPLE

Chief Corrosion Engineer, Reynolds Metals Co.

These data are applicable to high-purity aluminum as well as to a variety of aluminum alloys. Alloy choice should be based on a number of factors besides corrosion resistance. This information is intended to make possible rapid preliminary selection of construction material. It is not intended to show what is best for a given application.

Information can be obtained on a number of chemicals not included in corrosion keys by contacting Reynolds Metals Co., Dept. CP, 2500 S. Third St., Louisville 1, Ky. . . or check 6477 on form opposite last page.



New Tubeaxial Fan

solves tough air-handling problems

Here is Propellair's new answer to your old problem of handling difficult fume removal safely, efficiently and economically. The new Type BT Tubeaxial Fan is specifically designed to handle corrosive and explosive fumes, abrasive dusts, high temperature air . . . all the difficult air-moving problems. New, cast aluminum-alloy, airfoil propeller assures maximum efficiency. Dependable Robbins & Myers motor is protected inside and out against damaging environments. All sizes are available for immediate shipment.

PROPELLAIR "BT" FANS have the unique new features you've been looking for

1. Drum and streamlined belt tube are rolled from 12-gauge steel plate with gas-tight welds . . . no seams to leak or collect corrosive condensate. Clean design assures perfect bond of corrosion-resistant coatings.
2. Versatile motor-mount accommodates a wide range of motor sizes . . . makes motor changes quick and easy.
3. One-piece cast iron housing isolates bearing from the air stream . . . both bearing seats machined at one setting for permanent, perfect alignment.
4. Special high-strength, cast aluminum-alloy propeller . . . higher efficiency and greater corrosion resistance.



Write for Bulletin 620-C



When inquiring check 6478 opposite last page

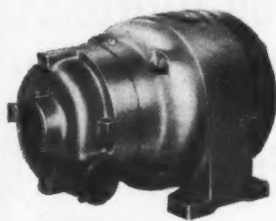
CHEMICAL PROCESSING

**Corrosion-resistant pumps
have high capacities
and head pressures . . .**

close-coupled junction between pump and motor permits easy seal replacement

Uses: In applications where protection against corrosion and product contamination is required.

Features: Units are said to have almost twice the capacity and head pressure ratings of conventional pumps of equal size and horsepower when operating at 60 to 70% efficiency range.



Centrifugal pump is constructed of stainless steel throughout

Description: Stainless steel units have a close-coupled junction between pump and motor which permits quick seal replacement.

(Flex-Seal pumps are a product of Bart Laboratories, Div. of Bart Mfg. Corp., Dept. CP, 225 Main St., Belleville, N.J. Check 6479 opposite last page.)

Correction

On page 200 of March CHEMICAL PROCESSING (Data sheet 147a) a table of thermal conductivities was presented. Column headings of this table were inadvertently reversed. The corrected table appears below and can be pasted in place on the data sheet.

**Thermal Conductivity of Mineral Wool
Insulation and Finishing Cement**

| Temp* °F | Thermal Conductivity | |
|-------------|---------------------------------|------|
| | cement (Btu, in/hr sq ft °F) | wool |
| 75 | 0.623 | |
| 100 | .640 | 0.33 |
| 200 | .696 | .36 |
| 300 | .752 | .39 |
| 400 | .809 | .42 |
| 500 | .866 | .465 |
| 600 | | .51 |
| 700 | | .565 |
| 800 | | .625 |
| 900 | | .69 |
| 1000 | | .755 |
| 1100 | | .825 |
| 1200 | | .90 |

*mean temperature for insulating material

These ACP processes for the
chemical treatment of metals
are corrosion preventives,
protect metals without painting

- Lithoform Z® for zinc
- Alodine 1200® for aluminum
- Permadyne® for steel

Lithoform Z forms an amorphous chromate coating on zinc and cadmium surfaces which retards the formation of *white rust* or *bloom*. It is effective on most types of electro-deposited zinc, zinc die casting alloys, hot-dipped galvanized surfaces, and cadmium plated products.

Alodine 1200 forms an amorphous chromate film on aluminum which becomes an integral part of the metal and improves the natural corrosion resistance of the metal. In addition to protecting unpainted surfaces, it is a durable and tenacious base for paint.

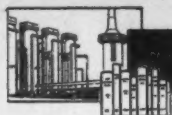
Permadyne—a heavy zinc phosphate coating chemical—forms an oil-adsorptive crystalline coating on steel. When used with such oils as Granoleum,® it provides excellent corrosion resistance.

*Write for complete information about
these ACP corrosion preventives*

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.
Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.



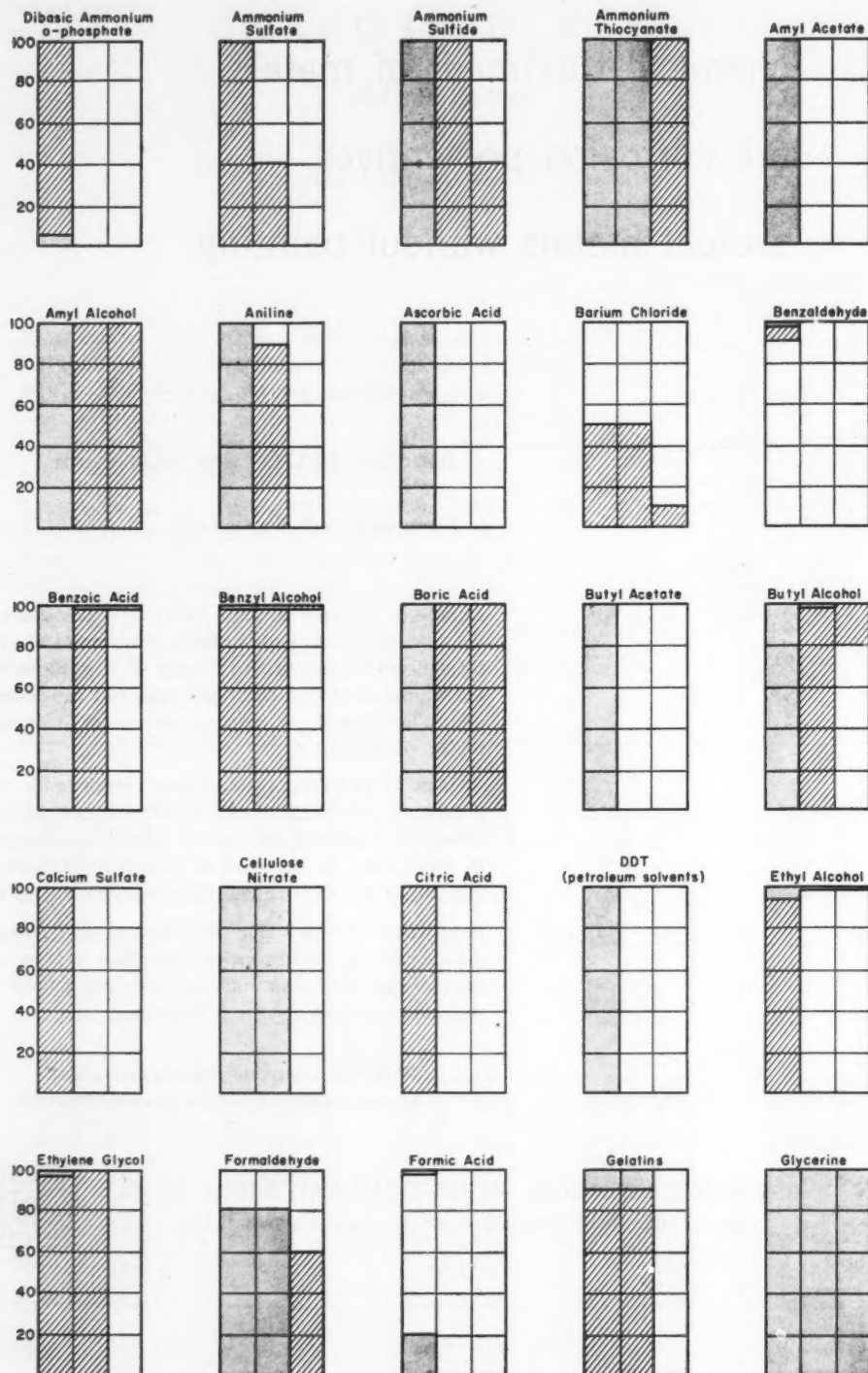
When inquiring check 6480 opposite last page



CORROSION KEYS: Aluminum

(Continued from page 80)

CORR RATE in/yr
 <0.005 0.005-0.020 >0.020



Depend on GOODALL
 and "RUBBERHIDE"
 for the Right Answer!

No matter what your corrosion problem may be, you can rely on Goodall engineering experience and technical skill to produce "Rubberhide" Linings in a specific compound that will provide the final solution. Compounded from rubber or neoprene to provide proper resistance to the specific corrosive agents involved, or to combat abrasive wear, these modern Linings will repay many times their cost through extended life of the products, parts or equipment to which they have been applied . . . from thumb screws to 20,000-gallon tanks.

"RUBBERHIDE" Linings are processed to objects shipped to our Linings Plants in Trenton, Chicago or Houston; or, when the objects are too large for such shipment, or the work involves fixed plant equipment, experienced field crews do the processing "on location". Whether factory or field processed, "RUBBERHIDE" Linings will assure effective, long-lasting protection.

Contact Our Nearest Branch for Details and Prices

Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING
 AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
 Branches and Distributors Throughout the United States and in Canada

When inquiring check 6481 opposite last page

CHEMICAL PROCESSING

Two sandblasters can operate from one machine . . .

no interruption of blasting necessary to refill chamber

Uses: For large scale sandblasting operations.

Features: Two sandblasters can work from one machine.

Description: Unit is equipped with two blast hoses working off two sand control valves. Machine is double chamber type holding 1000 lb of sand with automatic popup filling valves and 1 1/4" piping.



Two sandblasters can operate from this one unit

All blasting is done from bottom chamber which permits refilling of upper chamber without interrupting sandblasting. Abrasive in upper chamber automatically transfers to lower chamber.

(Sandblast machine is product of Clementina Ltd., Dept. CP, 2277 Jerrold Ave., San Francisco 24, Calif. Check 6482 on form opposite last page.)

Chemical fumes and spillage — conditions that require vinyl coating

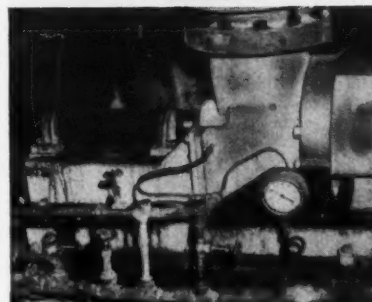
General maintenance protective coating system is designed for applications where conditions of exposure to chemical fumes or spillage require a material of high chemical resistance. Finish coat in system is a vinyl. Product can be applied directly by brush or spray to metal, wood, or masonry. It dries to a medium gloss finish with excellent adhesion. Solvents in system have a bland odor and are balanced so as to permit easy application to large confined areas. Coating has excellent hiding power and is available in a large range of colors.

(Uclon System 1400 is product of United Chromium Div., Metal & Thermit Corp., Dept. CP, 100 Park Avenue, New York 17, N.Y. . . . or for more information check 6483 on form opposite last page.)



May save several "G's"! In this elbow pump, handling 2200 GPM of mixed caustics, National Aniline expects . . .

2 1/2 times the life from INCO's new anti-galling "G" Nickel castings



This was a trouble spot.

For this pump dwells in corrosives, potassium and sodium hydroxide with carbonates and organic impurities.

Once tinkering was constant . . . "down-time" high. Now, for eight months, only packing has been needed. Once 41 days to two years life was "max." Now, engineers expect five years. Once the pump was made conventionally. Now, it's "G" Nickel cast by Inco.

"G" Nickel is a specially developed cast form of Inco Nickel with greater

resistance to galling . . . the same resistance to abrasion, corrosion and erosion and the same mechanical properties.

Maybe "G" Nickel would help you overcome trouble. Or, maybe you should explore Inco's seven other casting alloys . . . each developed to provide strength and resist corrosion, abrasion, erosion and other conditions.

Get this new booklet

"Cast to Outlast," new 16-page booklet shows how to apply Inco alloys. Gives basic properties, how to machine and join. Just write.

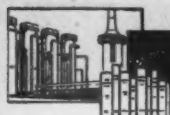
The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.



◀ **"G" Nickel halts wear and erosion**
In elbow, propeller, water ring, end cap and casing, Inco "G" Nickel resists cavitation-erosion. In glands and shaft . . . wear and abrasion. Made for National Aniline Division, Allied Chemical & Dye Corporation, by Lawrence Pumps Inc.

Inco Castings . . . Sand, Centrifugal, Precision

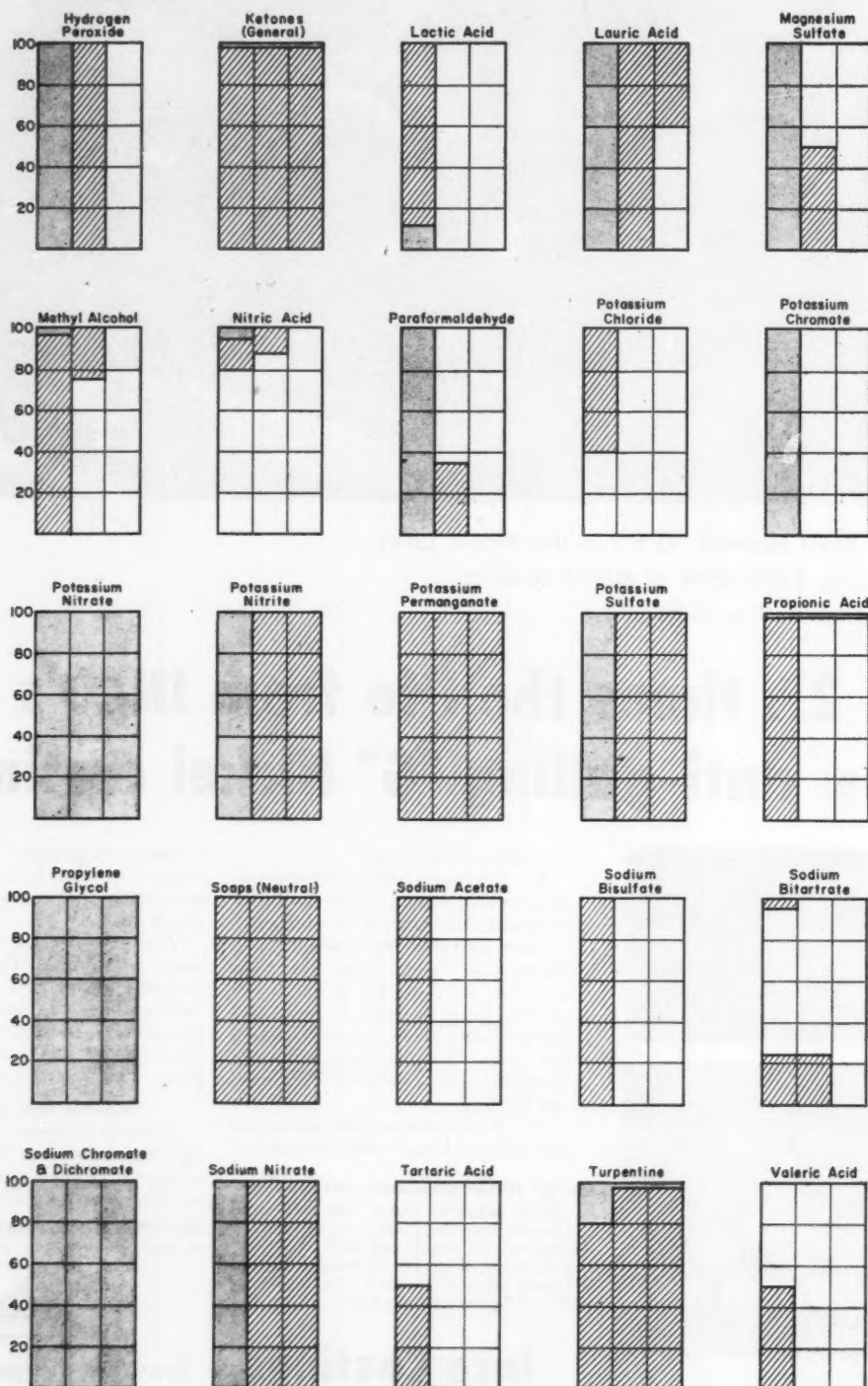
When inquiring check 6484 opposite last page



CORROSION KEYS: Aluminum

(Continued from page 82)

CORR RATE in/yr
<0.005 <0.020 >0.020



A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

MAGNETROL

AS DEPENDABLE AS MAGNETIC FORCE ITSELF

● No matter how specialized the liquid level control application, adapting Magnetrol to meet it presents no problem. Whether it's for high pressures, high temperatures, corrosive liquids or any other condition, a few "standard" modifications and the job is done! Operation is so simple no changes in basic design are needed. That's why Magnetrol "fits" practically any application — why "specials" are so often standard with us.

Because of the utter simplicity and dependability of its magnetic principle, Magnetrol has *infinite operating life*. There are no wearing parts to get out of order.

Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

MAGNETROL, Inc.

WHY NOT MAIL THE COUPON — NOW

MAGNETROL, Inc., 2129 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on Magnetrol Liquid Level Controls.

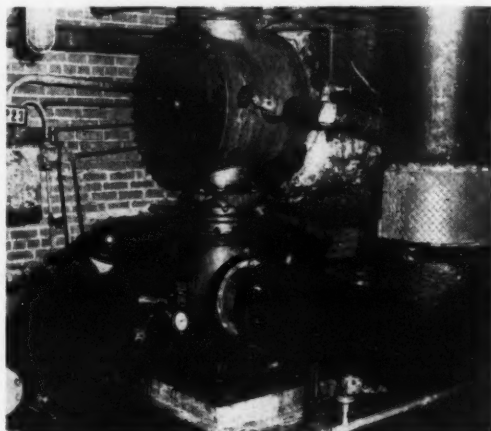
Name _____
Company _____
Address _____
City _____ State _____ Zone _____

**Caustic pumping problem solved
by using a nickel alloy unit
at National Aniline . . .**

pump has expected service life of five years compared to former 41 days to two years

Problem: Pumps had a service life of only 41 days to two years maximum handling hot caustic at National Aniline Div. of Allied Chemical & Dye Corp., Buffalo, N.Y. Maintenance was practically constant and downtime frequent. Units circulated a mixture of potassium and sodium hydroxides with carbonates and some organic impurities, on one stage of a caustic evaporator. Mixture has a spgr of 1.5. Temperature is 334°F.

Solution: Early in 1955 National Aniline placed in service a pump with elbow, propeller, water ring and cap, glands, shaft, and casing fabricated from "G" nickel, a cast nickel alloy. Alloy has carbon content of 1.0% maximum in the form of



Cast nickel forms propeller, shaft, and casing of pump handling caustic at National Aniline

nodular graphite for increased resistance to galling. It has corrosion, cavitation-erosion, and abrasion resistance. Unit was designed to pump 2200 gpm against 10' head. Packing box is water cooled.

Results: Pump has provided trouble-free service since installed. Only maintenance required has been periodic packing. Plant engineers expect a minimum service life of five years.

("G" nickel alloy is produced by International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N.Y. . . . or for more information reader may simply check 6486 on the Reader Service slip located opposite last page.)

(Caustic elbow pump is manufactured by Lawrence Pumps Inc., Dept. CP, 371 Market St., Lawrence, Mass. . . . or for more information reader may simply check 6487 on the Reader Service slip located opposite last page.)

How Stauffer Chemical whips fan corrosion

Silver metallizing
stretches wheel life from 6 weeks
to better than one year
in corrosive gases.



Fan rotor being metallized with silver for protection against corrosive gas

The Stauffer Chemical Company, Niagara Falls, N. Y., operates a chloro-organic acid unit in which process fans are used to convey corrosive gas in the operation of a column. Gas is primarily anhydrous hydrogen chloride, contaminated with small quantities of chloro-organic acid compounds.

A number of different coatings were tried out in an effort to prolong the life of the stainless steel wheels and shafts, as well as the cast-iron housings. Best of these lasted 4 to 6 weeks on the wheels, 2 to 4 months on the housings.

Test work carried on with Metal-Cladding, Inc., of North

Tonawanda, N. Y., indicated that fine silver was relatively unaffected by the gases in use. So the first wheel was metallized with this material after the base metal had been mechanically cleaned, sprayed with .005" of molybdenum for a bonding base, and .020" of nickel for toughness. Final silver coating was .025" thick.

A year later the first metallized surfaces were still in excellent condition. Since the cost of the metal spray work was about equal to the cost of a new untreated unit, the application paid for itself in about three months. In addition, inspection time and downtime were substantially reduced.

The following Metco* System contractors are set up to help you solve your corrosion problems with metallizing. For further information or copy of descriptive bulletin, write, wire or phone Metco Systems headquarters, address and phone number below.

*Reg. U.S. Pat. Off.

**Metco
System
Contractors**

Akron Sand Blast
& Metallizing Company
Arthur Tickle
Engineering
Works, Inc.

Dix Engineering Co., Inc.
F. W. Gartner Company
Gulf Engineering
Company, Inc.
Metal-Cladding Inc.

M W Protective Coatings
Div. of Metalweld, Inc.
St. Louis Metallizing Co.
The Southern
Galvanizing Company

Metco Systems

10 Bridge Street, Westbury, Long Island, New York
Telephone: Edgewood 4-1308

METCO SYSTEMS

10 Bridge Street,
Westbury, Long Island, N. Y.

Please send me descriptive bulletin on the Metco Systems.

name _____

title _____

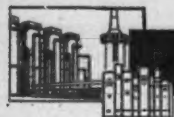
company _____

address _____

city _____ zone _____

state _____

When inquiring check 6488 opposite last page



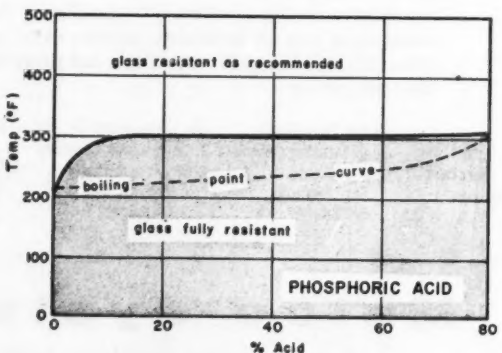
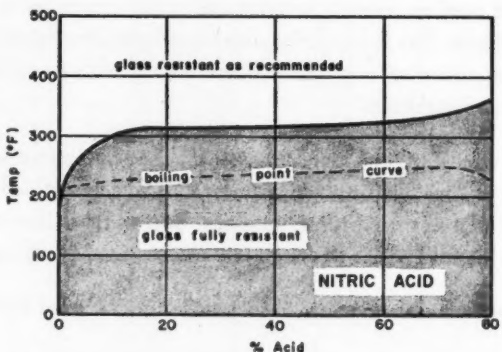
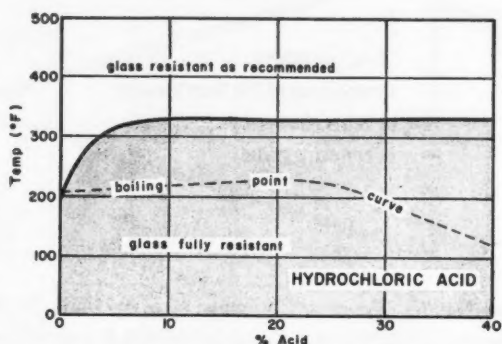
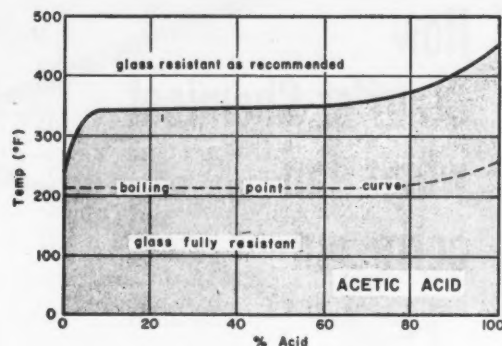
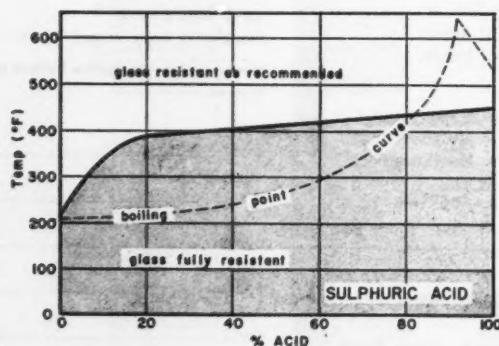
Corrosion resistance of glassed-steel

Data courtesy
THE PFAUDLER CO.

Data for corrosion-resistance charts was obtained as follows: Corrosion below boiling point was measured quantitatively. Corrosion tests above boiling point were made in glassed-steel autoclaves, filled half full with solution to be studied, heated to required temperature, and held continuously at this temperature for 15 days. Exposed surfaces were examined and corrosion resistance judged qualitatively.

Shaded portion of charts indicates temperatures and concentrations at which glassed-steel (type 53 glass) will resist various aqueous solutions of chemically pure acid for five years or over, in continuous 24-hr service. Unshaded portion shows conditions for which glassed-steel may be suitable in applications specifically recommended.

Charts were prepared from Bul 928 issued by The Pfaudler Co., Dept. CP, 1000 West Ave., Rochester 3, N. Y. When inquiring check 6489 on form which is located opposite last page.



Pumping Progress Report FOR CHEMICAL ENGINEERS

An advertisement prepared by the Aldrich Pump Co.,
Member of Hydraulic Institute, U.S.A.

UREA PRODUCTION, like many other chemical processes, presents difficult pumping problems. Urea slurry is both corrosive and erosive. Either condition can cause serious operational headaches; together they spell trouble for both design and maintenance engineers.

PUMPING UREA SLURRY was the problem given to Aldrich by a foremost urea producer. Our solution was effective. We recommended ...

A 6" STROKE DIRECT FLOW TRIPLEX with several modifications — porcelain plungers instead of hardened alloy steel — a Hastelloy B Fluid End. Direct Flow construction insured minimum cost replacements in the event of unavoidable corrosion damage.

ALDRICH DIRECT FLOW DESIGN offers many advantages to pump users. Two right angle turns are eliminated — the liquid being pumped travels directly, on a horizontal plane, from the suction to the discharge manifold. Reduced space between valves results in higher volumetric efficiency.

SECTIONALIZED FLUID-ENDS also afford greater economies of maintenance. Valves can be removed without special equipment. Individual sections of the fluid-end can be replaced at a fraction of the cost of conventional type fluid-ends.

DATA SHEET 67A describes the Aldrich 6" Stroke Direct Flow Pump Series, ranging in power from 300 to 900 hp. Aldrich Engineers are available to help solve your tough pumping problems. Write: The Aldrich Pump Company, 23 Gordon Street, Allentown, Pa.

When inquiring check 6490 opposite last page

CHEMICAL PROCESSING

**Mississippi Chemical Corporation
increases plant flexibility
with stainless tank . . .**

25,000-bbl unit used at plant for storage of ammonia nitrate

Stainless steel storage tank helps increase the flexibility of Mississippi Chemical Corporation's ammonium nitrate prilling plant at a Yazoo City, Miss. Tank is 78 ft in diameter, 30 ft high, and has a capacity of 25,000 bbl.



Ammonium nitrate storage tank at Mississippi Chemical is fabricated from stainless steel for maximum corrosion resistance. Note prilling tower at rear

Tank serves two main purposes: 1) to store ammonium nitrate in liquid form during periods of partial shut-down and 2) to store it in the off-season so it can be processed quickly in the high-demand season. Stainless steel was selected for the tank because of its high corrosion resistance to ammonium nitrate and also because of the possibility of storing nitric acid in the tank. Use of the tank permits the nitric acid plant to continue operation while prilling facilities are shut down for maintenance.

Outside of storage tank is insulated with foam glass, covered on sidewalls with light-gage aluminum to retain insulation and improve appearance of tank.

(Stainless steel storage tank is product of Chicago Bridge & Iron Co., Dept. CP, 332 South Michigan Ave., Chicago 4, Ill. . . or for more information check 6491 on form opposite last page.)

as you read
**chemical
processing**

. . . you may be wondering why you have been selected to receive it regularly . . . without subscription charge.

The Editors explain on page 118.

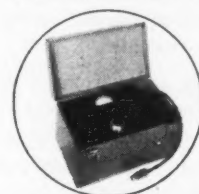
KNOW

YOUR CORROSION RATES!

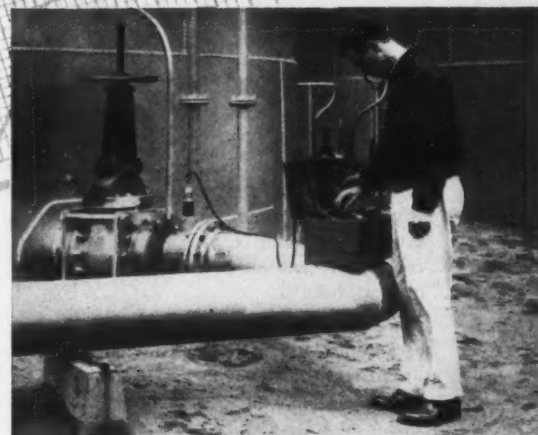
WITH THE CORROSOMETER

- DIRECT READINGS
- MICRO-INCH SENSITIVITY
- PROBES OF 30 ALLOYS
- FOR ALL CORROSIVE SYSTEMS

Quick, Convenient, Accurate. Now you can measure progress of corrosion at any location in your system or plant without need for handling test coupons, taking samples or disturbing plant operations! The CORROSOMETER system consists of any number of probes, which remain in continuous service and a meter which plugs into each probe to indicate extent of corrosion directly in micro-inches of metal lost. Probes are available to meet various processing requirements in Chemical Processing—Buried and Submerged Structures—Laboratory Testing—Petroleum Production and Refining—Food Plants, and other Industrial Applications.



**WRITE NOW
FOR FURTHER
DETAILS**



CREST INSTRUMENT COMPANY • 11808 S. BLOOMFIELD • SANTA FE SPRINGS, CALIFORNIA



When inquiring check 6492 opposite last page

**All-purpose
DEL protective coatings**

resist heat, humidity, chemicals and frequent scrubblings
minimize maintenance painting at New York Quinine & Chemical Co., Newark, N.J.

Few conditions are as hard on a paint as those found in an antibiotics plant.

At New York Quinine & Chemical Company, Newark, N. J., geysers of live steam from pilot vents constantly keep plant temperatures high, humidity close to 100%! Installations are unavoidably exposed to hydrochloric acid, caustic soda and other processing chemicals' fumes. In addition, the need for absolute cleanliness demands that floors and process vessels be hosed down regularly to prevent bacterial growth.

To meet these trying conditions, DEL Protective Coatings are used. Today, after 4 years' exposure to heat, humidity, chemicals and daily scrubblings, DEL Protective Coatings have helped keep New York Quinine's plant in excellent shape; very little maintenance painting is needed.

DEL products can solve your protective coating and sealing problems too.

DEL Protective Coatings are ideal where exceptional chemical resistance is a *must*! You'll find a DEL coating especially designed for protecting metal, masonry or wood against acids, alkalis, alcohol, oil, gasoline, solvents, salts or water. DEL Protective Coatings are formulated for use on new construction as well as plant maintenance, processing equipment and products finishing. There are DEL coatings for interior and exterior uses; many come in a variety of pastel colors.

The DEL coating used in the centrifuge area withstands one hosing down every shift.



DEL Protective Coating is used on processing vessels and piping not made of stainless steel.



Despite constant exposure to live steam, this tank shows no wear. It is protected with DEL.



FREE! Get the full story of DEL's many years of in-the-field experience in major chemical processing and industrial plants. Find out how DEL vinyl, epoxy, acrylic, silicone, synthetic rubber protective coatings and DEL Synthetic Rubber Compound (for sealing, caulking and glazing) can help you. For free literature, write today!



DAVID E. LONG CORP.

220 East 42nd St., New York 17, N. Y.

DAVID E. LONG CORP.

220 East 42nd St., New York 17, N. Y.

CP-76

Gentlemen: Please send me free literature on DEL Protective Coatings and DEL Synthetic Rubber Compound.

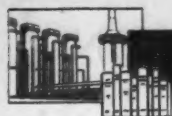
My name _____ Title _____

Firm _____

Address _____

City _____ Zone _____ State _____

When inquiring check 6493 opposite last page



Inhibitor injection guide

Courtesy HERCULES POWDER CO.

Nomograph below permits calculation of injection rates for liquid system additives. For Polyrad, an ethylene oxide adduct of primary rosin amine, used as a filming amine corrosion inhibitor in fractionators, condensers, and other refinery equipment, chart is used as follows:

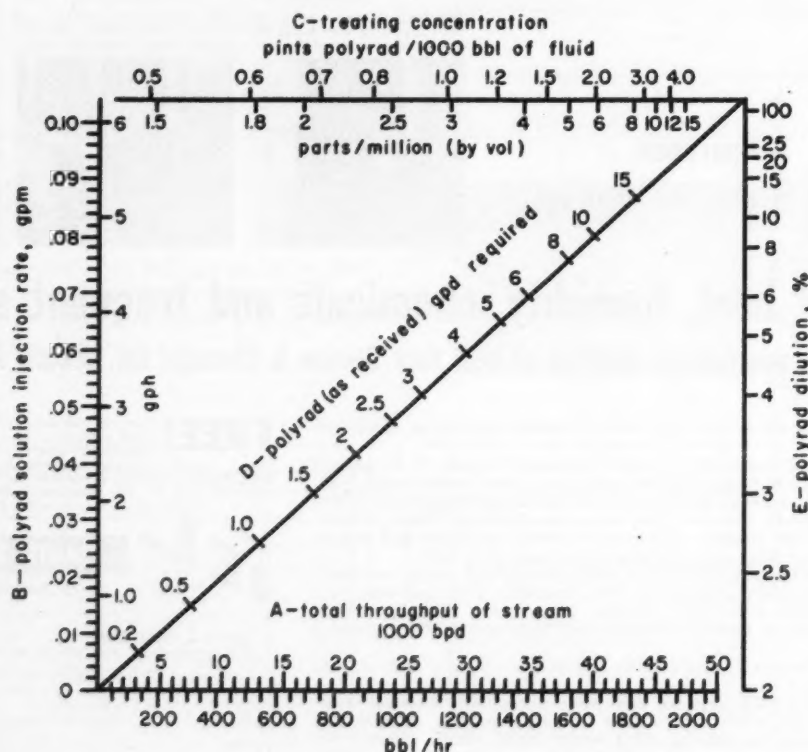
For a desired concentration of 6 ppm, such as is used at Socony Mobil Oil Company to reduce corrosion, (see *CHEMICAL PROCESSING*, Dec., 1955, p 14) in a unit handling 20,000 bpd, connect 20 on scale A and 6 on scale C with a straight edge. Read the required amount to be added to the stream per day on tie line scale D, (approx 5 gpd).

To find rate of addition per hour or minute use point on tie line previously found as base for straight edge

and connect this to concentration of additive to be used (5%) on scale E. You can read required addition rate by extending this line to scale B (0.07 gpm). Procedure can be reversed to find dilution required if injection rate is fixed.

Chart can be used to determine related values for addition of any liquid to a liquid system where all measurements are by volume.

This nomograph was taken from Form 400-503 issued by Hercules Powder Co., Dept. CP, Wilmington 99, Del. A brief description of Polyrad and table of conversion factors for corrosion units are also included. When inquiring specify 6494 on form opposite last page.



For Low Cost Corrosion Resistant And Maintenance Free Fabrications And Plastic Components To Your Specifications



Check With AMERICAN AGILE

■ As specialists in the field of structural plastics, anti-corrosion materials and methods, American Agile has perfected through many years of research and development new processes and applications for plastics.

American Agile...first introduced the spraying and forming of structural shapes from Polyethylene...first to commercially weld Plastics and first to commercially introduce irradiated Polyethylene molded parts. It will pay you to check with American Agile whenever you need fabrications or components that give you these advantages:

- ✓ Long Service Life
- ✓ High Impact Strength
- ✓ Light Weight
- ✓ Chemically Inert to 170°F.
- The polyethylene scrubber illustrated above, the largest ever made of this material, is another example of Agile's engineering. This unit is 5 ft. high, 4 ft. in diameter, with a gas flow of 2500 cfm at 1½" p.s.i. It is being used in contact with hydrofluoric acid and fluorides with concentration under 60%.

Send in your blueprints for a quotation or write for complete details..Ask for bulletin AA-2.



AMERICAN AGILE Corp.

PLANT AND GENERAL OFFICE

5401 DUNHAM ROAD • MAPLE HEIGHTS (Suburb of Cleveland), OHIO
Mail Address • P.O. BOX 168, BEDFORD, OHIO

When inquiring check 6495 opposite last page

CHEMICAL PROCESSING

CORROSION-RESISTING

INCO-CAST FITTINGS

OF MONEL[®] nickel-copper alloy & NICKEL

- Over 25 standard types
- Wide range of sizes
- Fast service through your nearby INCO Distributor

WRITE...

Our handy Catalog Price List contains full information. It's yours on request.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO
TRADE MARK

When inquiring check 6496 opposite last page

Spray sheet-like coatings

with **NEW** Unichrome
"SUPER 5300" Coating

Extraordinary,
heavy duty
vinyl plastisol
protects against

a broad range of chemicals and corrosion

In one coat, Unichrome "Super 5300" Coating builds a pore-free film 60 mils thick or more. It can therefore do many of the jobs for which plastic and rubber sheet materials are used. And you get a superior job... since there are no seams or joints with "Super 5300" Coating.

This plastisol spray applies easily; cures at 350° to 365°F. Nearby firms can apply it for you. It's tough, won't chip. Send for more information.

PLATING MATERIALS
ORGANIC COATINGS
TIN & ZINC CHEMICALS
ELECTRIC MATERIALS
RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

METAL & THERMIT
CORPORATION
GENERAL OFFICES: RANWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit-United Chromium of Canada, Limited, Toronto

When inquiring check 6497 opposite last page

JULY 1956

CORROSION

**Tantalum satisfactory
for plant service
with 98% H₂SO₄...**

corrosion loss only 0.0015"
per year at 392°F

Recent data and results of plant performance show that tantalum can be used with 98% sulfuric acid at temperatures up to 392°F with a corrosion loss of only 0.0015" per year. This corrects the impression that has prevailed that tantalum was limited to use in 70% sulfuric at 293°F.

Tests show that above 347°F, corrosion is uniform in 98% sulfuric and equipment life can be predicted with a good degree of accuracy. Above 482°F corrosion rate becomes quite rapid—0.029" per year. At 572°F rate is 0.342" per year. Tests are confirmed by good results the National Lead Co. has obtained using tantalum in sulfuric acid service at temperatures of 365°F.

Impression has also prevailed that tantalum might be oxidized by air at high temperatures. Tests show that oxidation of tantalum in air at 500°F is zero and at 536°F, the weight gain corresponded to a penetration of 0.00003" per year.

(Information courtesy of Fansteel Metallurgical Corp., Dept. CP, North Chicago, Ill. . . . or check 6498 on form opp. last p.)



"You advertised for a corrosion engineer?"

Give the boot to corrosion



...with La Favorite Linings

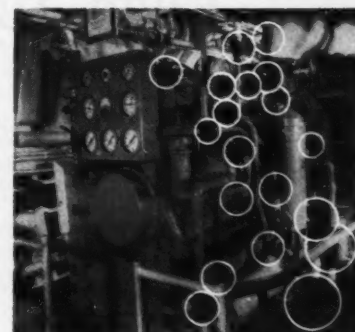
Processing equipment, conveying lines and accessories, storage tanks—all give new equipment performance when you boot out corrosive attack and related evils that bedevil production schedules. Armor inside surfaces with La Favorite high-strength-bond elastomer linings. It's profitable. For details, ask for Bulletin No. 55.



Typical of the intricate shapes lined with La Favorite protective elastomer compounds.

Give the boot to tremble and shake ...in pipe and duct lines

La Favorite all-rubber expansion joints give the boot to the tremble and shake in fluid conducting lines—take up stretch and shrink—give your duct and piping lines a calm performance that delays the point of no return. Details in data sheet—yours on request.

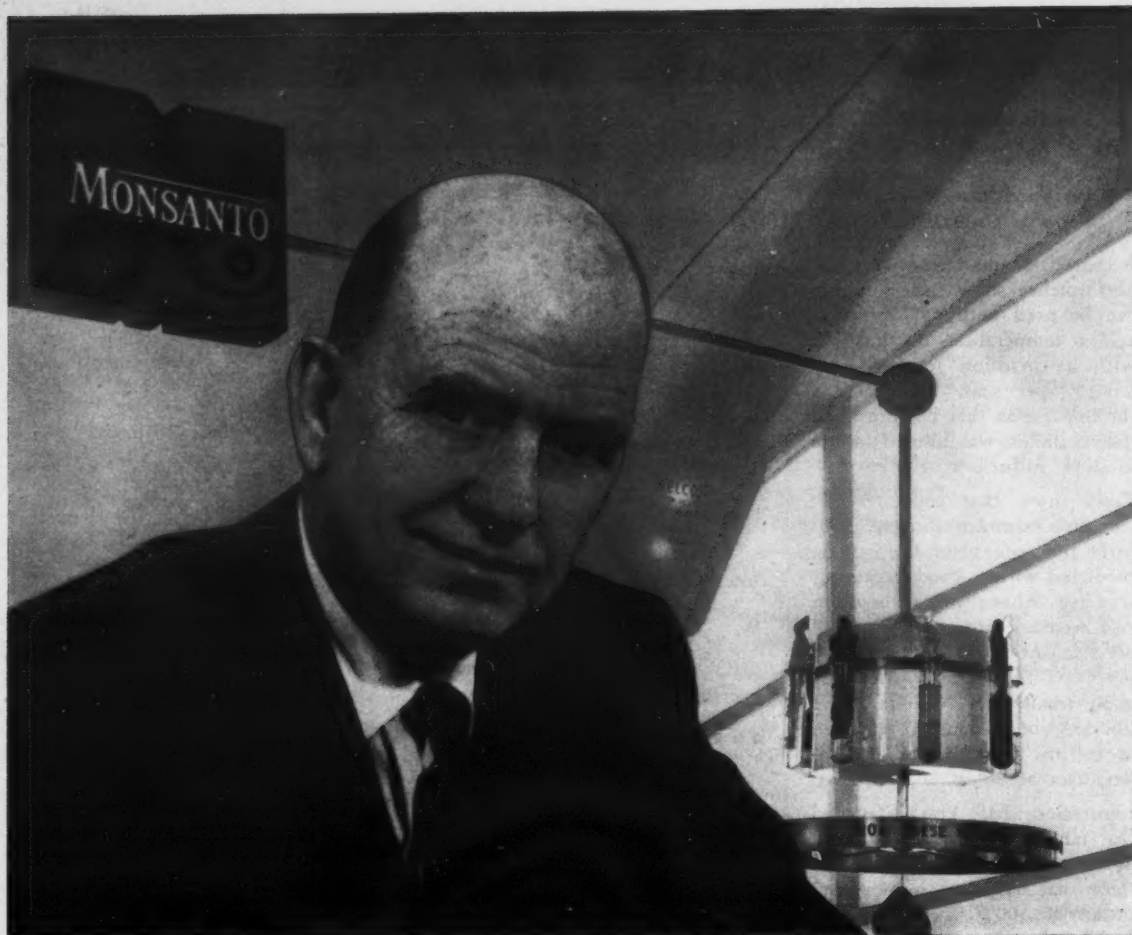


Nineteen La Favorite expansion joints in this naval power plant block the shivers in pipe lines.

LA FAVORITE Rubber Mfg. Co.

267 Wagaraw Road • Hawthorne, New Jersey

When inquiring check 6499 opposite last page



Seen in the background is Monsanto's new St. Louis Airport display.

"Business Publications help us keep tuned to our markets"

says CHARLES ALLEN THOMAS, President, MONSANTO CHEMICAL COMPANY

"Our business is so diverse," continues Mr. Thomas, "that it would be impossible to keep abreast of shifting market needs without the help of business publications. Our top executives — and our down-the-line people, too — consider business publication reading a necessary routine."

You will find that top men like Mr. Thomas, in every industry use business publications as a prime source of information about their own industry and their markets. And they not only read the editorial content, but they also place equal weight on your advertising message — for there, too, they find valuable information that can help them in their business.

That's why business publication audiences are interested in your advertising message. And that's why these publications are direct sales routes for your product or service.

Write for list of NBP publications — see how you can pin-point your market through the use of these technical, scientific, industrial, merchandising and marketing magazines.



NATIONAL BUSINESS PUBLICATIONS, INC.
1413 K Street, N. W., Washington 5, D. C. • STerling 3-7535

CORROSION CONTROL

Conversion coating for aluminum becomes fixed, non-smearing immediately . . .

improves corrosion resistance of aluminum, makes paint adhere better

Uses: To provide aluminum with a surface conversion coating for protection against corrosion, for improvement of paint adhesion.

Features: Chief advantage of product is the "quick fix" obtained: coating becomes fixed and non-smearing immediately upon application.

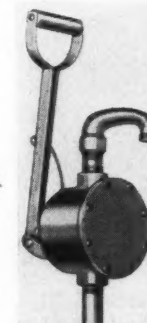
Description: Basically, material is a chemically created chrome-type complex film. Product itself is a yellow colored powder. Coating formed on aluminum surfaces is a thin, smooth, non-crystalline film with a slight metallic luster. Coating becomes interlocked and integral with the metal surface upon application. It is acid resistant and not brittle.

(Turcoat 4178 is development of Turcoat Products, Inc., Dept. CP, 6135 S. Central Ave., Los Angeles 1, Calif. . . . or for more information check 6501 on form opposite last page.)

Stainless steel, aluminum, plastic used for parts on hand pump . . .

piston-type, self-priming unit delivers 20 gpm

Uses: Pump is suitable for handling many industrial solvents, lubes, cutting or paint oils, soaps, waxes, and maintenance liquids.



Corrosion-resistant hand pump

Features: Features include stainless steel replaceable liner and shaft, aluminum body and piston, corrosion-resistant valves, molded plastic bearing, and built-in strainer.

Description: Piston-type, positive-displacement, self-priming hand pump delivers 20 gpm. It is available as pump only, barrel pump, pedestal pump, or with hose and nozzle delivery.

(Hand pump is product of Bowser, Inc., Dept. CP, 1300 E. Creighton Ave., Fort Wayne, Ind. . . . or for more information check 6502 on form which is located opposite last page.)

For more information on product advertised at right, specify 6503 . . . see information request blank opposite last page. ➡

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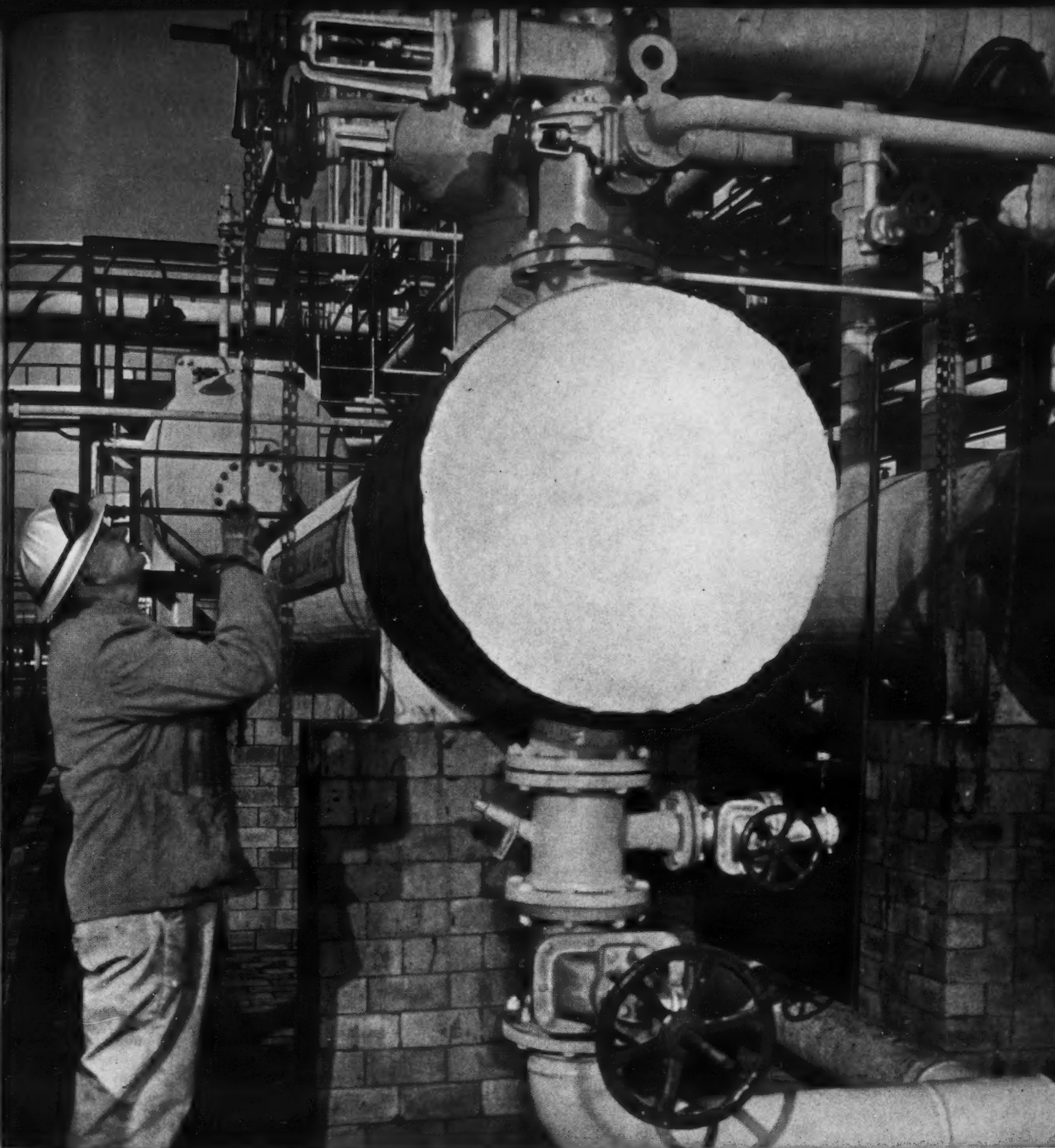
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Closing the gate on hard-to-hold hydrocarbons

At Esso Standard Oil's Bayway Refinery light hydrocarbons are used extensively at a wide range of temperatures and pressures.

Light hydrocarbons are hard to "hold," but the self-adjusting wedge design on Alloyco gate valves insures tight shut-off. Corrosion-resistant Alloyco valves — like the red-wheeled, chain-

operated gate valve above — are used throughout many process units.

You'll see many more of them on key jobs at leading petroleum, processing and chemical plants throughout the country. What about your corrosives-handling problems? Write Alloy Steel Products Company, Inc., 1301 West Elizabeth Avenue, Linden, New Jersey.

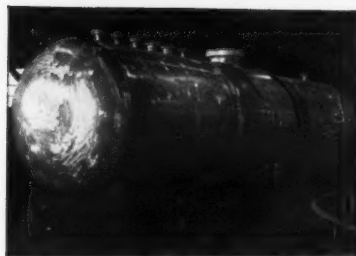
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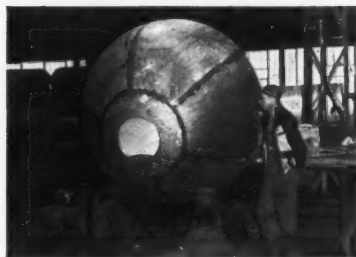
Subsidiary of Walworth Company



Your answer to corrosion problems



Aluminum tank for rocket fuel

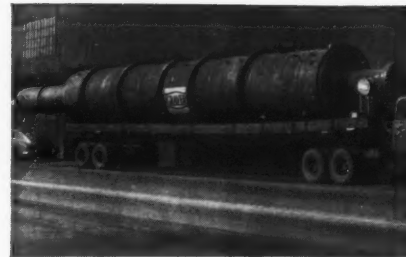


Solid stainless sphere for gas

Do you make or use or store liquids that cannot be contained by carbon steel vessels? If so, Graver will build your tanks and process equipment of corrosion-resisting alloys—stainless, or stainless-clad or aluminum.

Graver's highly developed techniques in alloy welding make it possible to build storage and process vessels to exacting new specifications of corrosion resistance.

Bring your tough problems to Graver.



Stainless-clad vacuum column

GRAVER

Autoclaves
Digesters
Elevated
water tanks
Oil field
equipment
Pressure
vessels ✓
Storage tanks
Towers
Weldments

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

CHICAGO • NEW YORK • PHILADELPHIA • EDGE MOOR, DEL. • PITTSBURGH • DETROIT • TULSA
SAND SPRINGS, OKLA. • HOUSTON • LOS ANGELES • FONTANA, CAL. • SAN FRANCISCO

When inquiring check 6504 opposite last page.

CHEMICAL PROCESSING

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GRA

5050
1850

WH

JULY

FLOORED BY FLOORING PROBLEMS

YOUR SOLUTION IS IRVING GRATING



For heavily abused areas:

IRVING Continuity Armoring

concrete-filled steel grating floor will not crack or break up. Inexpensive to install, it eliminates costly repairs AND IS SAFE.

Non-Sparking and Corrosion- Resistant

ALUMINUM GRATING

extra-light, self-draining, self-ventilating, economical, strong and durable.

Perfect for Chemical Plants where fire is a hazard.

★
Ask about
IRVING "GRIDSTEEL"
CONTOUR RETAINER MESH
for Castable Ganister Linings used
in fractionating units.

IRVING SUBWAY GRATING CO., INC.

ESTABLISHED 1902

OFFICES and PLANTS at
5050 27th St., Long Island City 1, N.Y.
1850 10th St., Oakland 20, California

When inquiring check 6505
opposite last page

CORROSION CONTROL

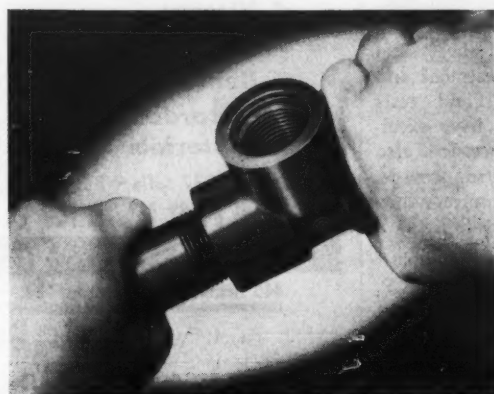
**High-strength PVC pipe
is chemical resistant
and tough . . .**

working pressure of extra-heavy pipe is 490 psi

Uses: For handling a long list of chemicals, including many troublesome organics.

Features: In addition to the excellent chemical resistance, working pressure of the 1/2" extra-heavy pipe is 490 psi and that of the 2" extra-heavy pipe 255 psi at 70°F.

Description: Plastic pipe is made of unplasticized PVC. Pipe and fittings are available in sizes from



Plastic pipe and fittings are available in sizes from
1/2 to 2"

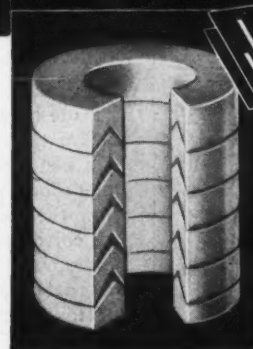
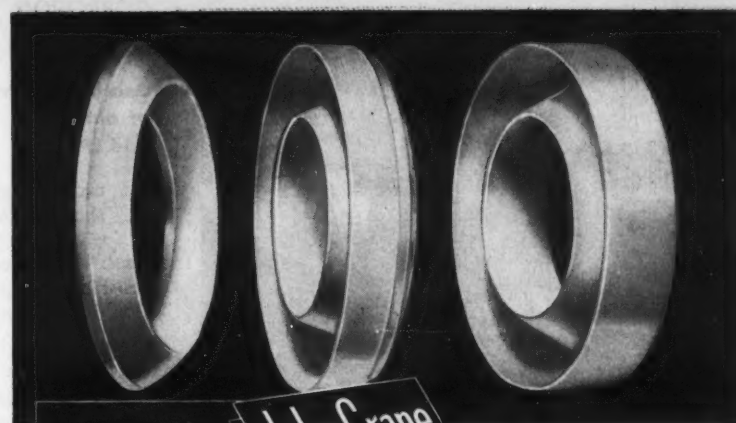
1/2 to 2". Standard or extra-heavy wall construction can be furnished.

(Rivclor PVC pipe is product of American Hard Rubber Co., Dept. CP, 93 Worth St., New York 13, N. Y. . . or for more information check CP 6506 on form opposite last page.)

**Bul describes fluorocarbon rubber
that resists fuming nitric**

Properties, applications, compounding, vulcanization, and fabrication of Kel-F elastomer — a fluorocarbon rubber with excellent resistance to heat and corrosion — form subject matter of 16-page brochure. Publication is designed for those who might use or specify the elastomer. Indicative of the elastomer's chemical resistance is an illustration of immersion test results of various rubbers in red fuming nitric acid. Among rubbers tested, the fluorocarbon elastomer, after one week of immersion, was the least affected.

Bul on Kel-F elastomer is issued by The M. W. Kellogg Company, Dept. CP, P.O. Box 469, Jersey City 3, N.J. When inquiring specify 6507 on form opposite last page.



John Crane

CHEMLON*
C-V RINGS
ARE INDUSTRY'S MOST
UNIVERSAL PACKING . . .

Countless successful applications of C-V Rings under the most severe service conditions have made this the closest approach to a universal packing.

It will effectively handle all industrial acids, alkalis, solvents, organic and hydraulic fluids . . . temperatures from -120°F. to +500°F. . . is equally suited to valves, pumps, mixers, hydraulic cylinders and like equipment.

"John Crane" C-V Rings have extremely low coefficient of friction. "Break-out" friction is only slightly higher than running friction.

TWO STYLES ARE AVAILABLE:

C-VU RINGS for low pressure service
—such as control and regulator valves handling gases and fluids, where it is necessary to have a very sensitive and resilient type packing.

C-VH RINGS for high pressure service
—for use in pumps, hydraulic cylinders and like services at pressures ranging to 500 psi. and over. These rings are constructed with a heavy wall heel to withstand pressure requirements. They are designed to provide voids between rings, so that as the Teflon expands due to heat,

this take-up room minimizes any excess friction in the stuffing box. "John Crane" C-V Rings are available in full line of standard sizes and male and female adaptors. Sizes can be molded to stuffing box specifications.

Request Bulletin T-110.

*"John Crane" C-V Rings are made from Chemlon—the best in DuPont Teflon.

Crane Packing Co., 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ont.



CRANE PACKING COMPANY

When inquiring check 6508 opposite last page



Plastic Coating Stops Costly Condensation Drip and Rust

THE COSTLY PROBLEM caused by dripping from this sweating pipe was permanently solved with one easy and inexpensive application of NoDrip Plastic Coating. Sweating pipes, ceilings, air ducts and other metal equipment are also completely protected against rust and corrosion by low cost NoDrip.

NoDrip Plastic Coating acts immediately to insulate and protect. One application adds many years of service life to metal equipment. NoDrip is also resistant to acid, alkali and brine...protects concrete, brick, plaster, tile wood or composition surfaces.

Easy application requires no special equipment or skill. Anyone can apply NoDrip with brush, trowel or spray. Stop your condensation problem now! Get full details without delay.

JW Mortell
COMPANY

32-PAGE NoDrip DATA HANDBOOK

Complete with photographs, charts and technical information to solve your condensation problem. Write today.

Available at leading plumbing and mill supply houses

J. W. MORTELL CO., 530-G Burch St., Kankakee, Ill.

Please send my FREE copy of the NoDrip Data Handbook.

Name _____

Company _____ Title _____

City _____ Zone _____ State _____

When inquiring check 6509 opposite last page

CORROSION

Combines advantages of aluminum and steel . . .

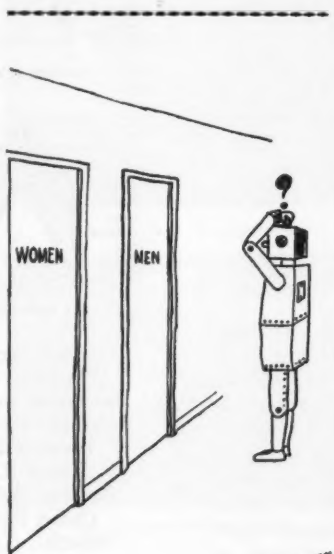
excellent corrosion resistance shown by field tests

Uses: For construction where resistance to atmospheric corrosion is required.

Features: Aluminum-coated steel combines the corrosion-resisting and heat-reflecting qualities of aluminum with the strength of steel.

Description: Aluminized steel is made by applying molten aluminum to cold-rolled sheet steel by a continued pretreatment and immersion process. Field tests show the material to have excellent corrosion resistance. It is also highly resistant to fire damage. Material does not require painting to extend its service life.

(Type 2 aluminized steel is product of Armco Steel Corp., Dept. CP, Middletown, Ohio . . . or for more information check 6510 on the convenient Reader Service slip which is located opp. last page.)



Thanks to Peter J. Tiemstra of the Swift & Co. laboratory, Harrison, N. J.

IF IT'S TOUGH TO PUMP...

You need a
SHRIVER
DIAPHRAGM
PUMP

for

- ✓ Corrosive
- ✓ Abrasive
- ✓ Viscous
- ✓ Thick • Heavy
- ✓ Delicate
- ✓ Hazardous Materials

Bulletin 137 tells why.

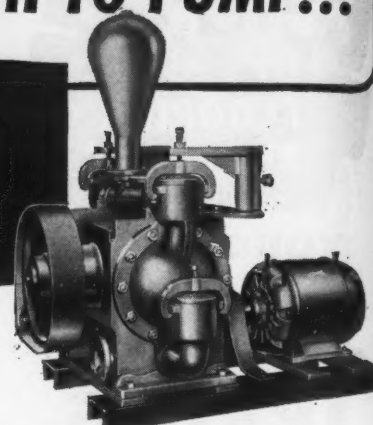
T. SHRIVER & COMPANY, Inc.

Filter Presses • Filter Media • Diaphragm Pumps

846 Hamilton St., Harrison, N. J.

Sales Representatives in
Decatur, Ga.—Houston, Tex.—St. Louis, Mo.
San Francisco—Montreal—Toronto

When inquiring check 6511 opposite last page



POINTS TO REMEMBER

- No contact between fluid handled and mechanical parts of pump.
- Minimum maintenance cost.
- No packings, hence no leakage.
- Parts contacting fluid made of any metal, rubber or synthetic resin lined.
- Easy to inspect and clean.
- Ample pressure; wide capacity range.

MARION MACHINE

SPECIALISTS IN STAINLESS STEEL FABRICATION

Stainless Steel Tanks... For Immediate Delivery!



- Two New, Identical Tanks
- Capacity, 4000 gallons
- Type 304
- 150 PSI Fittings
- Diameter, 8'
- Depth, 11'
- U-tube Heating Coils

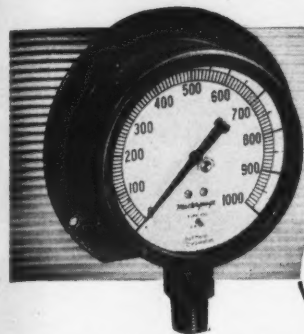
For further information on the above and other stainless steel fabricated products, write . . .

MARION MACHINE, Foundry & Supply Co.
Dept. SS, Marion, Indiana

When inquiring check 6512 opposite last page

CHEMICAL PROCESSING

MARSH Mastergauge



where
only the
best is
good
enough!

Always the best of the better gauges, Mastergauge has been given plus features that further lengthen its lead.

A still better tube construction: Socket, tube and end piece are now all fused into one leak-tight unit by the new Marsh "Conoweld" process.

A still better case: New copper clad wrought steel "Marshall" case has the corrosion resistance of pure copper; weighs one third as much as cast iron, and is four times as strong.

An even finer movement: Further refinements are added to the rugged, corrosion resistant, virtually frictionless stainless steel and monel Mastergauge movement. A typical refinement is the "coined" (extruded) sector gear which contributes extra strength and precision.

Where only the best is good enough—in the most critical industrial refinery and oil country services—"Mastergauge" is your instrument.

WRITE FOR NEW CATALOG

MARSH INSTRUMENT CO. Sales affiliate of Jas. P. Marsh Corporation
Dept. Z, Skokie, Ill.

Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas
Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd St., Edmonton, Alta.

When inquiring check 6513 opposite last page

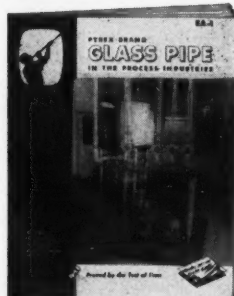
How many of these pipeline headaches do YOU have?

- ☐ Corrosion ☐ Clogging
- ☐ Cleaning ☐ Cost
- ☐ Contamination

This Corning bulletin can help you

"PYREX brand 'Double-Tough' glass pipe in the Process Industries" tells how others in a variety of process industries are whipping tough piping problems with glass pipe. You'll recognize the names of most of the companies who are using PYREX pipe to handle such acids as sulphuric, hydrochloric, nitric, acetic, and such other fluids as chlorinated hydrocarbons, hydrogen peroxide, bromine, brines, low-concentration alkaline solutions, wine, milk, other beverages and foods.

The book covers a wide range of products, problems and processes. Among them you may well find problems similar to yours—solved with PYREX pipe. Bulletin EA-1 is free. Simply send the coupon or check this publication's reader service card for your copy.



Corning means research in Glass

CORNING GLASS WORKS

37 CRYSTAL STREET, CORNING, N. Y.

Please send me Bulletin EA-1: "PYREX brand 'Double-Tough' glass pipe in the Process Industries."

Name Title

Company

Address

City Zone State

When inquiring check 6514 opposite last page

JULY 1956

CORROSION

Increases life of part in acid service at Gulf Oil . . .

alloy paddles resist sludge at 430°F

Problem: Average service life of only 30 days was obtained for paddles made of several materials used in a pug mill, part of an acid sludge decomposition unit at Gulf Oil Corporation's Port Arthur refinery.



This part has been used to convey a hot, abrasive, and corrosive mixture of coke and acid sludge into a roaster. It is 5' long and 14" in diameter

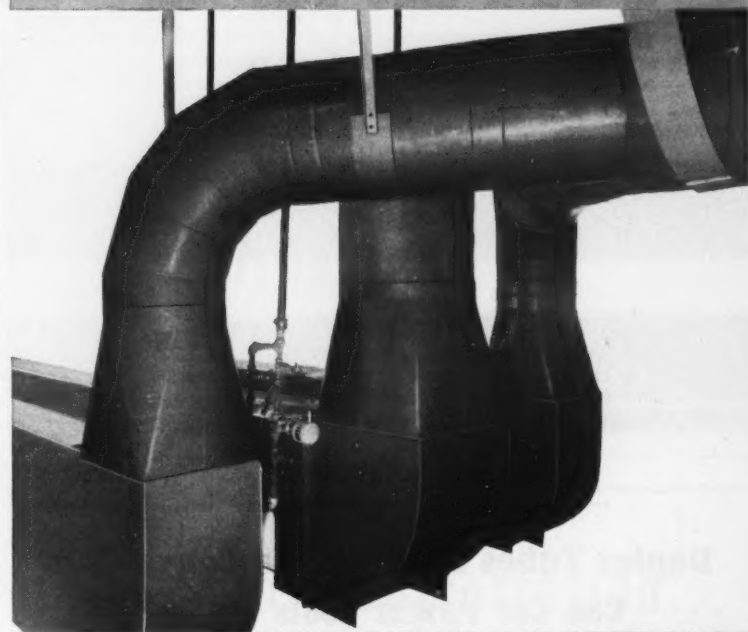
Unit roasts about 40 tons of oil refinery sludge per day at 430°F. Sulfur dioxide produced by roasting is piped to a contact plant and made into sulfuric acid. Roaster also makes about nine tons of high grade coke per day.

Solution: Hastelloy alloy B was used for the pug mill paddles where acid sludge charge to the plant is mixed with recycle coke, the mixture then passing on to the roaster furnace.

Results: Paddles made of Hastelloy alloy B have given three to four months service in the pug mill in place of the former 30 days. Due to a process design change, at present the acid sludge is no longer injected into the pug mill. Instead, the sludge and recycle coke are fed to a screw conveyor, discharging directly into the roaster. Because of the good service given by the paddles, entire conveyor screw is made of alloy B.

(Hastelloy alloy B is product of Haynes Stellite Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 6515 on form opposite last page.)

anodizing fume corrosion stopped



by KAYKOR VYFLEX® F-92 PVC

A large midwestern manufacturer of aluminum parts for household appliances was having corrosion troubles. All efforts to keep a fume exhaust system in service over the anodizing tanks failed . . . until he discovered F-92 structural PVC. In a typical application of this tough, resistant material, his 25' anodizing tanks were equipped with F-92 hoods, which vented fumes to 24" and 32" stacks of the same material.

Sulfuric acid splash and fume from the anodizing tanks can't harm the new exhaust system because it's completely fabricated of unplasticized Polyvinyl Chloride . . . even to the nuts and bolts. Inert to the widest range of corrosive processing agents, at temperatures to 165F, this Kaykor material also offers such attractive physical properties as high tensile and flexural strength, hardness, abrasion resistance, and electrical and thermal insulation properties.

Well equipped, highly experienced Kaykor fabricators across the country stand ready to solve your corrosion problems with standard or custom designed equipment and parts of VYFLEX F-92 PVC.

GET THE FACTS! Write for complete information in new Bulletin "F-92", available free on request to Kaykor Industries, Inc., 4401 Broad St., Yardville, New Jersey, or ask your local Kaykor fabricator.



KAYKOR INDUSTRIES INC.
Division of Kaye-Tex Manufacturing Corp.
YARDVILLE, NEW JERSEY

When inquiring check 6516 opposite last page

BRIDGEPORT BRASS COMPANY

CONDENSER AND HEAT EXCHANGER TUBE EDITION

COPPER ALLOY BULLETIN



MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



Sections of low-carbon steel condenser tube showing extensive effects of rust and corrosion on the water side in comparison to the unaffected surface of the ammonia side.

Duplex Tubes In Ammonia Condensers Can Cut Power Costs Up To 25%

The use of ammonia and other refrigerants in refrigeration systems has increased tremendously in recent years. Many problems—old and new—involving the handling of corrosive gases and liquids continue to crop up in domestic, industrial, processing, chemical and refining applications of refrigeration and air conditioning. It is important that we learn how to handle these corrosive gases and liquids.

In general, condenser tubes in refrigeration systems are subjected to dual corrosion; that is, one type of corrosive action inside the tube, an entirely different type on the exterior side. For this reason Bridgeport Duplex Tubes—with one metal inside and a different metal outside—are finding ever-wider application in the solution of these complex corrosion problems.

Ammonia Refrigeration

Although dry ammonia gas is not corrosive to many metals and alloys, it is not always used in the completely dry condition. When ammonia contains dissolved salts, water, air or other common contaminants, it severely attacks copper and copper-base alloys.

Steel, on the other hand, is very resistant to ammonia corrosion, and is widely used in equipment handling ammonia (both anhydrous and moist). However, low-carbon steel tubes have a major shortcoming that prevents their being the universal answer to ammonia

refrigeration corrosion problems, namely; water corrosion.

Corrosion from the water or brine side has always been a problem with low-carbon steel tubes. While steel tubes are satisfactory in withstanding corrosion from the ammonia side, the water side rusts quickly... builds up a heat-insulating layer which must be removed from time to time at considerable cost.

This problem is now being overcome through the installation of Duplex Tubes composed of low-carbon steel to the ammonia side, and copper or copper-base alloys, on the water side. For circulating fresh water—Admiralty #30, Red Brass #85, or Copper are recommended. Where sea water is used for cooling, Aluminum Brass #54, Duroz IV #53 (Arsenical Aluminum Bronze) and Admiralty #30 are preferred because of their greater resistance to de-zincification corrosion, and general corrosion by sea water. When velocity of sea water is comparatively high, greater resistance to impingement corrosion is given by Duroz IV #53 and Aluminum Brass #54.

With Freon and methyl chloride refrigerants in a dry condition, copper and copper-base alloys have proved very satisfactory for corrosion resistance and long tube life. Arsenical Admiralty #30 or Aluminum Brass #54 are recommended for installations using sea water as the coolant. Copper, Red Brass, Admiralty, etc. are popular for fresh-water installations.

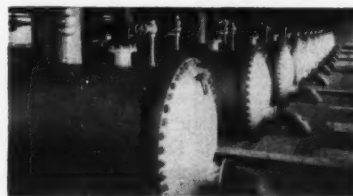
How Bridgeport Duplex Tubes Can Save You Money

Improved Heat Transfer. Mechanical bonding between the two components of Duplex Tubes is so tight that very satisfactory heat-transfer characteristics result. In addition, slime, algae and marine growths have less tendency to foul copper-base alloys than steel. Using copper or copper alloys on the water side therefore improves heat transfer because single-wall steel tubes pile up a thick insulating coat of rust which lowers heat-transfer value.

Reduced Maintenance, Shutdown Time and Labor. An ice company that replaced its steel tubes with Duplex (steel/Admiralty) reported two years later that four semi-annual cleanings were avoided...operating pressures are running 15 to 2 pounds lower...and that their Duplex Tubes have already paid for themselves.

Cut Power Costs! Replacement of corroded steel tubes in ammonia condensers has reduced power costs in some cases as much as 25%.

Greater Corrosion Resistance. Corrosion from water is often most severe at the inlet end of steel tubes, where turbulence is highest. Duplex Tubes will give greater corrosion resistance toward scale-forming waters which have been treated. And often in untreated raw waters—which would corrode low-carbon and stainless steels—Duplex Tubes can be used successfully.

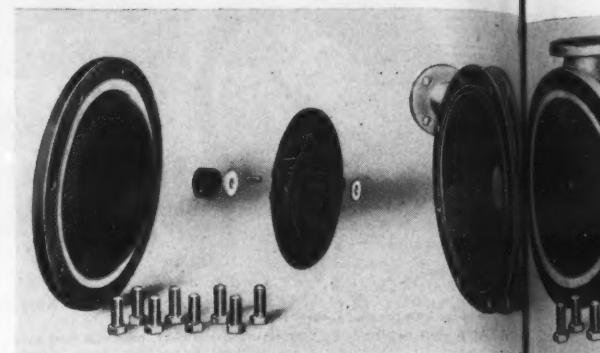


Ammonia condensers equipped with Steel/Copper Duplex Tubes—Courtesy York Corporation.

More Than 100 Combinations

Bridgeport produces a wide variety of alloys, from which more than 100 Duplex Tube combinations can be manufactured. Specialists in our Corrosion Laboratory will gladly assist you in determining the condenser tube alloy that will give the best service in your specific application. Please write or phone your nearest Bridgeport Sales Office today for this expert assistance, and for delivery of Bridgeport high-quality copper alloys. (1198)

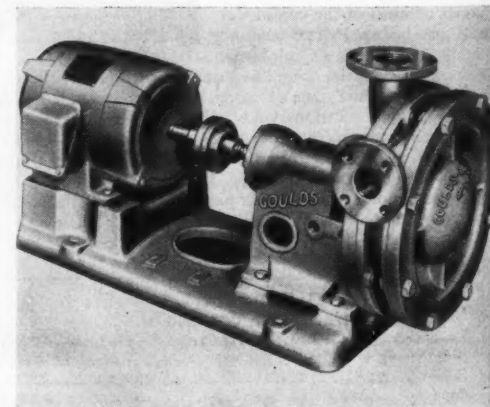
CORROSION CONTROL



GLASSED CENTRIFUGAL PUMP

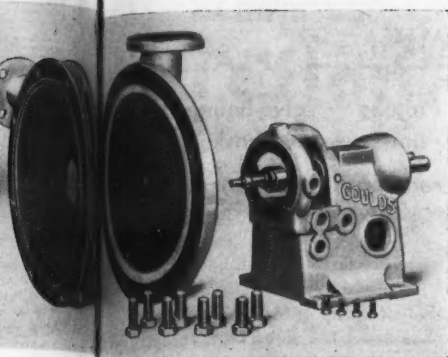
outstanding development
in corrosion control

Resists all acids
except hydrofluoric,
prevents contamination



One advantage of glassed centrifugal pump is that many sticky products won't cling to the glass surface

When inquiring check 6517 opposite last page

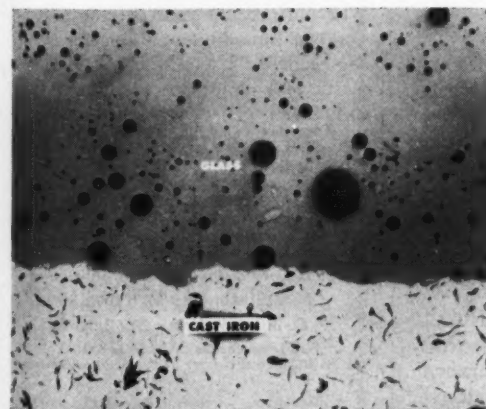


All surfaces which come in contact with liquid, shown in color, are glassed

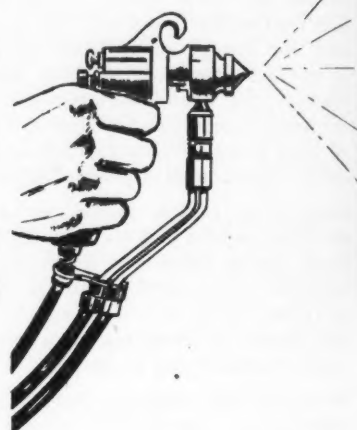
ONE of the most important recent achievements in the battle against corrosion is the successful development of the glassed centrifugal pump. Since all surfaces that come in contact with liquid being pumped are glassed, unit is resistant to all common acids except hydrofluoric and to alkalis up to pH of 12. Another advantage that means much in many chemical applications is the elimination of contamination or catalytic effect from contact of liquid with pump. Also many plastics, synthetic rubbers, and other products which cling to metal will not stick to glass. Hence, flow qualities are improved and cleaning facilitated.

Until recently it was not possible to successfully apply glass to all surfaces of irregularly shaped castings such as the impeller of a centrifugal pump. One problem was to devise a technique for permitting release of the hydrogen without causing a defect in the glass. This was accomplished by a special method.

(Please turn to next page)



Magnified view of interlocking chemical bond between glass and cast iron created at fusion temp



If it takes a
Paint Film
5 mils thick
to stop corrosion...

you'll get it in just 2 passes of the gun with

TYGON "ATD"

HOT SPRAY PAINT

With just two passes of the spray gun you can build a non-sag film 5 or more mils thick with Tygon "ATD" Hot Spray—a film thickness that would require five or six coats of conventional cold spray paint.

You'll save yourself 20% -30% in application costs; you'll save yourself countless hours of "down time;" and you'll get the proven protection that has made Tygon Paint tops in protective coatings for more than 15 years.



Write for this new TYGON Protective Coatings Manual—jam-packed with information that will help you get more out of your maintenance painting dollar

294 E


U. S. STONEWARE
AKRON 9, OHIO

New York • Chicago • Houston

When inquiring check 6518 opposite last page

Contamination Protection of Pure Nickel at 1/6th Cost!

the structural strength
of seamless steel
plus
the protection of
pure nickel



LECTRO-CLAD Nickel Plated Seamless Steel PIPE and FITTINGS

BART LECTRO-CLAD will withstand any fabrication process that low carbon steel itself will take—without affecting the tough, durable contamination-free nickel plate.

In the past, the Chemical Processing Industries, where contamination of product is critical, had to undergo the heavy expense of installing process lines and equipment of pure nickel, stainless steel, or other costly contamination-free materials. NOW—in many such applications—you get the contamination and corrosion control you must have, at a FRACTION OF THE COST of materials offering comparable protection.



Before you spend another penny on contamination-free process lines or equipment, learn how BART LECTRO-CLAD saves thousands of dollars in initial investment alone. Send for free copy of fully illustrated catalog covering technical data and applications.

BART MANUFACTURING CORPORATION
229 MAIN STREET BELLEVILLE 9, NEW JERSEY

When inquiring check 6519 opposite last page

CORROSION CONTROL

Glassed Pump

(Continued from preceding page)

Procedure was also developed for evenly controlling the thickness of glass where close clearance for moving parts is important.

Techniques for grinding certain parts such as seal joints and impeller shaft were devised. Sharp corners were removed. Casing, cover, and suction pieces were built as separate glassed parts which fit together to make the pump.

After glass is sprayed on parts, they are fired in a furnace of 1700°F. Several coats of glass are applied and fired until a layer 1/32" thick is obtained. Glass and iron become solidly bonded by chemical action at the high temperature. In a test glassed-steel plates made in this manner were twisted 14° without any evidence of separation of glass-steel bond. Fragility of glass is not a serious problem since a sharp blow only causes damage at point of impact.

Pump is designed so suction can be placed in any of three positions and discharge outlet in four positions. Casing assembly is sealed against glass with retained Teflon envelope gaskets. Stuffing box is placed on suction side of impeller to minimize pressure against it. Pump can use a mechanical seal in place of stuffing box if desired.

Semi-open type impeller is keyed to shaft. This permits pump to handle solids ranging up to 5/16 to 3/4". Unit is suitable for outdoor installation since it is completely sealed to exclude moisture and dirt. The pump will be offered in seven different sizes with capacities up to 700 gpm and heads to 180'.

(Glassed pump is joint development of the Pfaudler Co., Rochester, N. Y. and Goulds Pumps, Inc., Seneca Falls, N. Y.)

(For more information on Goulds-Pfaudler glassed pump contact Goulds Pumps, Inc., Dept. CP, Seneca Falls, N. Y. . . . or for more information about manufacturer's product, reader may simply check 6520 on form opposite last page.)

On chemical-resistant plastisol and wash primer

Test results showing the resistance of a vinyl plastisol to a variety of corrosives are included in two-page bulletin on this product. Product described has excellent resistance to vapors of trichlorethylene and perchlorethylene. Second bulletin of one page tells of a one-package wash primer which has excellent outdoor durability.

Bulletins on 77X-1078 and 40X-610 protective coatings are issued by Stanley Chemical Company, Dept. CP, East Berlin, Conn. When inquiring reader may simply specify 6521 on the convenient Reader Service slip located opposite last page.

CURE FOR CONTAMINATION

KEL-F® PLASTIC

- piping • valve linings
- lined vessels • gaskets

prevent equipment corrosion ... protect stream purity

One of the hazards of equipment corrosion is the resulting contamination of the product being processed. In such critical cases KEL-F fluorocarbon plastic offers a practical solution by providing a protective barrier between corrosive process stream and processing equipment.

Molded and fabricated valve linings, gaskets, ring seals, piping, and tubing of KEL-F plastic and laminated lined tanks, vessels, and reactors protect equipment against corrosion . . . prevent product contamination.

A UNIQUE PLASTIC

KEL-F plastic is virtually inert to all chemical attack—including mineral acids, oxidizing agents, and strong caustics. Its anti-adhesive property is an advantage in maintaining clean, unclogged lines and equipment.

A dense, tough thermoplastic, KEL-F plastic has outstanding physical properties: high compression strength, resistance to heat and cold, low moisture absorption. Supplied as a molding material, it can be readily molded by injection, transfer, or extrusion. Qualified fabricators are now producing piping and fittings, tubing, sheets, plastic laminates, rods and films of KEL-F plastic.



Why not take up your specific corrosion problem with one of our chemical engineers. He'll show you how KEL-F plastic may be just the solution. Write us today.



THE M. W. KELLOGG COMPANY

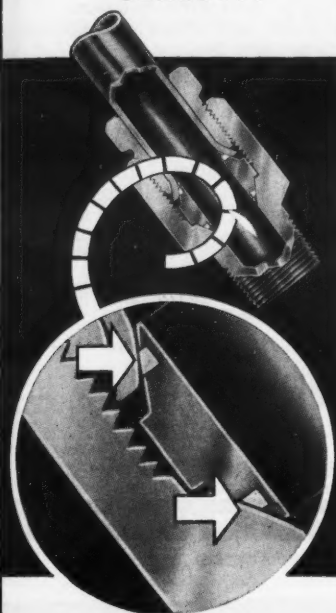
Subsidiary of Pullman Incorporated
Chemical Manufacturing Division
P. O. Box 469, Jersey City 3, N. J.

® KEL-F is the registered trademark of
The M. W. Kellogg Co. for its fluorocarbon products

When inquiring check 6522
opposite last page

CHEMICAL PROCESSING

THESE EXCLUSIVE "CONTAINED" Teflon SEALS...



MAKE KONCENTRIK EXTRA SAFE FOR HIGH PRESSURE OR VACUUM USE

No other tube fitting gives you this positive protection against costly, dangerous line losses... because only Konkentrik incorporates the "contained" Teflon seals. These Teflon rings compress into all surface irregularities as the fitting is tightened... to provide an extra sealing action that is vacuum tight. You get a metal-to-metal and a Teflon-to-metal seal when you specify Konkentrik! Another important point is that no shear-action ferrule is used which might cut, weaken or work-harden the tubing. With Konkentrik, the full wall thickness of the tube is maintained to insure peak safety in operation. Your copy of our catalog covering over 2,000 fittings in Stainless, Nickel and Monel is ready for mailing. WRITE FOR IT TODAY.

**THE SPECIAL SCREW
PRODUCTS CO.**
Bedford, Ohio

When inquiring check 6523
opposite last page

CORROSION CONTROL

**Gives floors protection
from alkalis, acids,
and solvents...**

material has greater abrasion resistance and strength than concrete

Uses: For application over concrete to give floors additional protection.

Features: Material resists acids, alkalis, and solvents. It provides abrasion resistance five to six times greater than concrete and is four times stronger than concrete.

Description: Material is composed of three basic ingredients: 1) a thermosetting resin liquid, 2) a hardening agent, and 3) an aggregate-type filler. Product handles like cement topping and is applied to thicknesses from 1/4" minimum to 3/4" maximum (per layer). Material cures in a few hours to a dense, impermeable, and non-dusting surface.

(Corocrete A is product of The Ceilcote Co., Inc., Dept. CP, 4834 Ridge Rd., Cleveland 9, Ohio... or for more information check 6524 on form opposite last page.)

**Capacities of 50 to 1000 gal
available in glass fiber
corrosion-resistant tanks...**

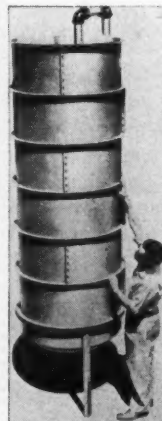
economical units withstand wide variety of chemical materials

Uses: For storage of most chemicals, including acids, bleaches, formaldehyde, solvents, and petroleum products.

Features: Since tanks are mass produced, they can be obtained at a moderate cost. They are available in a wide range of sizes from 50- to 1000-gal capacity.

Description: Glass fiber tanks are constructed with two standard sections — a domed end section and a center section. To assemble, a flanged center section is attached to an end section by 48 bolts and a neoprene or vinyl gasket. As many center sections as required may be added to give the required capacity. Preformed glass fiber pipe fittings may be installed in any required position.

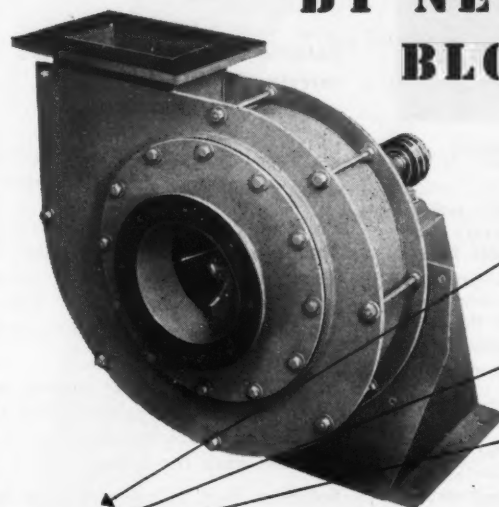
(Glass fiber tanks are product of Jones & Hunt, Inc., Dept. CP, Cove Way, Gloucester, Mass... or for more information check 6525 opposite last page.)



OUTMODED BY NEW PVC (Type 1) BLOWERS

Designed by

ipf



CB 13 3/4
Arrangement No. 1

If your problem is expelling corrosive fumes and gases, you need IPF Blowers. Ordinary blowers are susceptible to attack by these fumes and gases. Coating the blower is costly — and not foolproof. Maintenance and replacement costs are high... and valuable time is lost. Result — an expelling operation that eats into profits.

For trouble-free, long-life blowers, specify IPF blowers made of Unplasticized, Rigid Polyvinyl Chloride (UPPVC). UPPVC — the new construction material — exhibits inherent anti-corrosive qualities that allows IPF Blowers to withstand most chemical fumes and gases from 40°F to 140°F. Actual installations of IPF Blowers have lasted three times the normal life of ordinary blowers... and continue to function efficiently.

UPPVC is a lightweight... smooth surfaced... nonporous material of construction. Lightweight construction means greater capacity per B.H.P. ... easier installation... reduced handling problems. Smooth, nonporous finish never require painting or maintenance expense. IPF Blowers are not subject to unbalance from chipping of a protective coating... because there is no coating. It's solid UPPVC.

IPF Blowers made of UPPVC are available in standard sizes that provide displacements from 143 C.F.M. to 7722 C.F.M. Standard wheel sizes of 9 1/2, 13 3/4, 19, and 27 inches. Other sizes and capacities can be custom designed to fit special requirements. Full details on the new IPF Blowers available upon request.

Full details on the new IPF Blowers available on request.

MANUFACTURED BY
industrial plastic fabricators, inc.
NORWOOD, MASS. NORWOOD 7-3411

When inquiring check 6526 opposite last page

Molded Hard Rubber proves best for . . .

Temperature and Corrosion Resistance



ANOTHER CORROSION PROBLEM SOLVED BY LUZERNE

Above is shown a portion of a typical cell in Western Electric Company's Electroforming plant at their Point Breeze Works. This cell consists of a plastic lined metal shell with hard rubber weirs fastened to each end. The feed weir shown is cored and connected to the electrolyte supply line by a flexible elbow.

Western Electric reports that a number of materials were considered for fabrication of these weirs and flexible elbows and it was concluded that hard rubber and neoprene provided the best combination of temperature stability, corrosion resistance, mechanical strength, ease of fabrication, and moderate cost.

Luzerne fabricates these hard rubber parts for Western Electric: — Luzerne can solve your corrosion problem too. Write for information on Hard Rubber Molded Products, or send your problem for analysis by our engineering department.



The LUZERNE RUBBER CO.

200 Mulrhead Avenue

Trenton, N. J.

Sales Representatives
ALBERT J. COX CO.
Chicago, Ill.

R. C. FOLTZ CO.
Houston, Tex.

L. A. RUBBER & ASBESTOS WORKS
Los Angeles, Calif.

When inquiring check 6527
opposite last page

CORROSION CONTROL

Chemical resistance and applications of corrosion-proof cements

Two pages of data which show the chemical resistance of corrosion-proof cements to a variety of materials are included in 12-page publication on acid cements. In addition to acids, cements covered are resistant to alkalis, solvents, greases, detergents, and salts.

Bul 5-2 is issued by The Atlas Mineral Products Company, Dept. CP, Mertztown, Pa. When inquiring specify 6528 on form opposite last page.

Colorful coatings for tankcars carrying alkaline latices are not attacked . . .

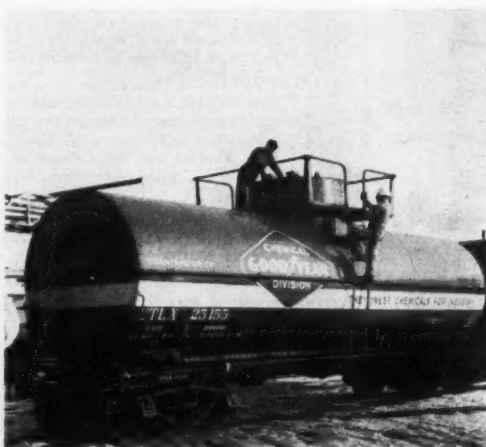
based on high-styrene/butadiene copolymer, coatings resist oil, salt, abrasion

Problem: Protective coatings for a group of Union Tank Car Company 10,000 gallon tankcars had to resist the alkaline nature of styrene and nitrile latices that they were to carry. These latices, which contain as much as 10% alkali, presented a corrosion problem.

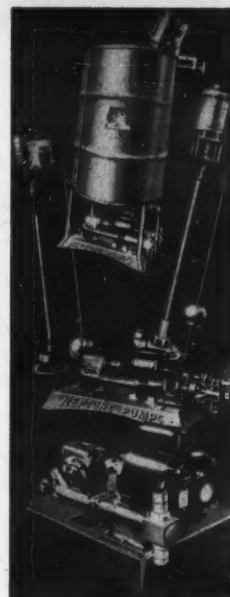
In addition, the tankcar coatings had to be inert to oil, acid, and salt to which they are exposed and also had to be able to resist abrasion of sand, dirt, and dust while the tankcars are in transit.

Solution: Blue, yellow, and white finishes based on a high-styrene/butadiene copolymer were specified. Made by Kanartex Coatings, Inc., Galesburg, Illinois, the finishes were applied to 19 cars last fall.

Prior to putting on the finish coats, the exterior surfaces of the cars were wire brushed to remove any loose rust and scale. The surfaces were treated



Attractive finish for tankcars is in three colors and is corrosion and abrasion resistant



For liquid-handling

too costly by ordinary methods

NEPTUNE CHEMICAL PROPORTIONING PUMPS

Serving many industries . . . Chemicals • Paints • Petroleum • Water • Paper • Sewage • Pharmaceuticals • Foods

NEPTUNE MODEL 100 Proportioning Pump for 12 gph capacity. Helps eliminate costly corrosive problems . . . piston, valves and trim are 316 stainless steel. Controlled feeding.

NEPTUNE MODEL 300 for pressures up to 1500 psi and quantities up to 80 gph. All Neptune Pumps can be furnished in special alloys to your specifications.

NEPTUNE CHEMICAL FEED UNIT is available with any Neptune Proportioning Pump. Tank agitator and pump are combined as an efficiency unit.

LIGHT AND HEAVY-DUTY SUMP PUMPS, with explosion-proof motors, are available in various lengths and of special stainless steel alloys.

For details, write for Bulletin 100 PB



NEPTUNE Pumps

NEPTUNE PUMP MANUFACTURING CO.
4912 NORTH 6th STREET • PHILADELPHIA 20, PA.

CHEMICAL PROPORTIONING PUMPS AND SUMP PUMPS

When inquiring check 6529 opposite last page

EPOLOID

FOR
CHEMICAL
ENVIRONMENTS

Everything you could ask
in an epoxy resin coating — plus
a most superior, fast-curing,
easily handled activator.

Send for technical bulletin on the
ROWE EPOLOID SYSTEM of Positive Protection.

ROWE
PRODUCTS INC.

College Avenue
and Hyde Park Boulevard
Niagara Falls, New York

When inquiring check 6530 opposite last page

CHEMICAL PROCESSING

Methods

S
chemicals
• Paper
Foods
portioning
ps elimi-
stainless

pressures
up to 30
be fur-
specifica-

UNIT
Proport-
and pump
it.

SUMP
motors,
and of

PB

PA.

UMPS

001

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When plans
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ACID PLANT VESSELS

custom fabricated on the West Coast

YOU'LL SAVE TIME, TROUBLE, AND MONEY BY CONTACTING
PUGET SOUND FABRICATORS

Your "on the spot" source with over 55 years of experience in handling a wide variety of fabricating jobs involving steel plate and alloys up to 1" thickness

SUPPLY PRINTS FOR PROMPT QUOTATION ON YOUR NEXT JOB



REQUEST NEW BROCHURE
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Craftsmen in Metals Since 1900



**PUGET SOUND
FABRICATORS, INC.**

3670 E. Marginal Way Seattle 4, Wash.

When inquiring check 6531 opposite last page

ORDER DIRECT!

Prompt Shipment
Anywhere

"Metalsmiths"
Stainless Steel
and Monel
Utensils

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Order with confidence. Over 30 years' supplying process industries. Highest quality materials and workmanship for durable, corrosion-resistant service. Additional items—beakers, stock pots, batch cans, shovels. Get catalog—Send a trial order.



WRITE FOR LATEST CATALOG — PRICE LIST



Division of Orange Roller Bearing Co., Inc.
356 White Street Orange, N. J.

When inquiring check 6532 opposite last page

JULY 1956

CORROSION

with Kanartex "Gay-Lux" metal etcher and cleaner, a phosphoric acid solution which contains wetting agents. Cars were then rinsed with water and dried. A thin phosphate coating was left on the metal surface.

A self-leveling primer that contained zinc chromate was sprayed on. This was followed by a finish coat of the latex-based paint. Pthalocyanine blue pigments were used in the formulation to assure a permanent, non-fading finish. Coat was spray-applied.

Masking and stenciling followed after coat was dry. Goodyear trademark and the familiar "UTLX" are stenciled in a bright yellow. Infrared was used to hurry the drying. C. O. Dix Company made the Goodyear stencil. Besides the lettering, a one foot high strip was painted in white, around the center of the cars.

Results: All 19 cars are keeping their attractive appearance and no maintenance has yet been required.

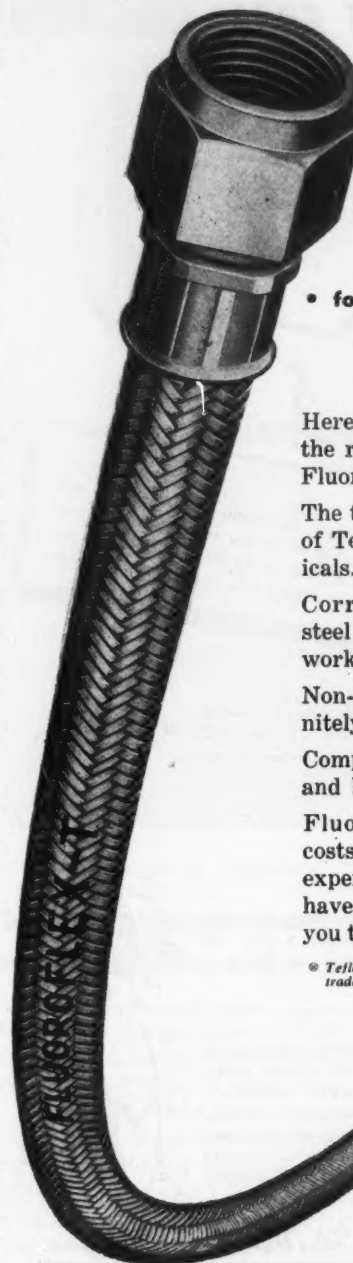
(Finishes were formulated with Pliolite S-5 high-styrene/butadiene latices made by Chemical Division, The Goodyear Tire and Rubber Co., Dept. CP, 1144 E. Market St., Akron 16, Ohio . . . or for more information reader may simply check 6533 on the convenient Reader Service slip opposite last page.)

Catalog on stainless and alloy fittings

Forged stainless and alloy fittings for use at high temperatures and under corrosive conditions are described in eight-page catalog. Engineering data, sizes, and other information is given on fittings available in a wide variety of alloys.

Bul S-1-55 is issued by Watson-Stillman Fittings Div., H. K. Porter Company, Inc., Dept. CP, P.O. Box 95, Roselle, N. J. When inquiring specify 6533A on the convenient Reader Service slip which is located opposite last page.

Finest flexible hose yet for corrosive conditions



Resistoflex Teflon® hose
proves ideal...

- for handling all corrosive fluids
- for hardworking steam and gas lines
- for temperatures to 500°F

Here's the original "flexible piping" with the remarkable properties of Teflon. It's Fluoroflex®-T R500 hose.

The tube, made from a special compound of Teflon, is completely inert to all chemicals.

Corrosion resistant SAE 304 stainless steel wire braid reinforces to 1000 psi working pressure.

Non-aging hose . . . stays flexible indefinitely from -100°F to +500°F.

Compression fittings . . . are leakproof and blow-off proof.

Fluoroflex®-T hose cuts replacement costs, reduces downtime and maintenance expenses, improves operations. If you have a tough hose problem, it will pay you to contact us. Send for Bulletin FH-2.

® Teflon is a DuPont trade mark. Fluoroflex is a Resistoflex trade mark.

IF IT'S NEW'S IN
TEFLON HOSE — IT'S SURE TO BE
FLUOROFLEX-T

RESISTOFLEX

CORPORATION

ROSELAND, N. J. • WESTERN PLANT: BURBANK, CALIF.

When inquiring check 6534 opposite last page

- CLOTH FOR HOT ACID FILTRATION
- CLOTH FOR HOT DUST COLLECTION

**USE CLOTH MADE FROM
"ORLON"**



This cloth is available in standard width of 38" from stock. We will weave any desired width from 26" through 72" to your order in quantities as low as 100 linear yards.

We have a background of over Forty Years in weaving Industrial Fabrics... we weave all of our own Synthetic Fiber Filter Fabrics. We have the "know how" necessary to produce uniform Filter Cloth with outstandingly superior operating characteristics.

Literature and pilot test sample available on request.

We also weave filter cloth of VINCEL[†], SARAN, DYNEL, NYLON, VINYON N^{**}, GLASS, DACRON^{††}, TEFLON^{***}, POLYETHYLENE.

... for your Filter Paper requirements try NETONE Filter Paper. High tensile strength, chemical resistant, high burst factor, abrasion resistant and crease resistant. Send for a test sample.

[†]TM for duPont Acrylic Fiber
^{††}TM—NFM Reg. U. S. Pat. Off.
^{**}TM UCCAC Co.
^{***}TM for duPont Polyester Fiber
^{****}TM for duPont Tetrafluorethylene Fiber

If high operating temperatures are your problem we suggest you try this NFM cloth made from ORLON^{*} Acrylic Fiber. Here are some of its values:

No loss of strength after 32 days exposure to air at 257° F.



Shrinkage not more than 2 1/2 % in water at 212° F.



Good resistance to hot mineral acids, weak alkalis, common solvents, oils, greases, neutral salts, most acid salts and chlorine.



General Offices & Mills: New Haven 14, Conn.
Western Office and Factory: Salt Lake City 2, Utah

Sales Offices—Representatives

Los Angeles, Calif.: 811 West 7th Street
Chicago, Ill.: 2557 W. Peterson Ave.
Cincinnati, Ohio: Roselawn Center Bldg.

Houston, Texas: 1503 Hadley St.
Oslo, Norway: Nicolai Friis
Johannesburg, South Africa: Edward L. Solomon

When inquiring check 6535 opposite last page

CORROSION

Draining faucets feature of PVC tanks...

long service life principal advantage

Uses: For use with electroplating baths, for handling cleaning solutions, and for other corrosive applications.

Features: Polyethylene tanks are equipped with draining faucets.



PVC tank is shown being used with funnel made of same material to transfer contents to smaller container

Description: Shell of tank is molded of polyethylene and top is reinforced with heavy molded band. Units are available in a variety of sizes. Principal advantage of the tanks is their long service life in corrosive applications.

(PVC tanks are a product of American Agile Corp., Dept. CP, 5461 Dunham Rd., Maple Heights, Ohio. Check 6536 opposite last page.)

On care and use of stainless

In one section of 16-page publication information is given on the proper care and use of stainless steel. Relative corrosion resistance, physical properties, and other data are furnished on Type 430 stainless sheet.

Bul on 430 MicroRold stainless is issued by Washington Steel Corp., Dept. CP, Washington, Pa. Specify 6537 opposite last page.

NEW "TROPOXY" HAS NEW DEGREE OF CHEMICAL CORROSION RESISTANCE

**Multiple Coats are Applied within
Hours for Correct Film Thickness**

Tropical's new "Tropoxy" enamel provides far superior, longer lasting exterior surface protection from corrosive chemicals. On metal, wood, concrete, plaster, brick, cement and cinder block it outlasts regular industrial paints many times. Color-fast. No days of delay between coats. A 5-mil film is built up within a few hours. Use "Tropoxy" coatings wherever corrosive fumes or liquids disintegrate exterior finishes.

FREE! Your letterhead request brings our bulletin on "Tropoxy" Primers and Finish Coats. Write today!

TROPICAL PAINT COMPANY
1128-1242 W. 70th, Cleveland 2, O.
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1963 • SUBSIDIARY OF PARKER RUST PROOF COMPANY

When inquiring check 6538 opposite last page

PUMP

Liquids • Gases • Slurries
**WITHOUT CORROSION
OR CONTAMINATION**



Prices range from.....\$55 to
depending on size of pump and
accessory equipment required. \$500

Write for Catalog

SIGMAMOTOR Inc.
18 North Main Street • Middleport, N. Y.

When inquiring check 6539 opposite last page

CHEMICAL PROCESSING

CORROSION

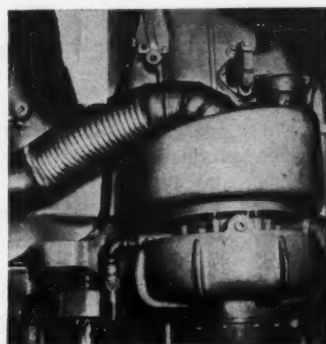
**Temperatures up to 1250°F
can't hurt flexible
exhaust tubing . . .**

fabricated from chromium-nickel 302 alloy steel

Uses: For heavy-duty exhaust service.

Features: Product can withstand constant exhaust temperatures to 1250°F without damage.

Description: Flexible exhaust tubing is fabricated from stainless steel to give it corrosion resistance. Product incorporates a soft copper wire packing which functions to plate the interlocking flexible tubing joints while in use



Corrosion-resistant exhaust tubing installation

to provide maximum flexibility. Another type is available which does not have the copper wire packing. Both are fabricated from chromium-nickel 302 alloy steel.

(Flexible exhaust tubing is product of Universal Metal Hose Co., Dept. CP, 2133 S. Kedzie Ave., Chicago 23, Ill. Check 6540 opposite last page.)

Describes many types of stainless wire

Analyses, tensile strengths, and physical properties of 12 types of stainless steel wire are given in six-page bulletin. Bul is issued by Webb Wire Div., The Carpenter Steel Co., Dept. CP, 15 Liberty St., New Brunswick, N. J. Specify 6541 opposite last page.



FOAMGLAS®
the cellular, *stay-dry* insulation

At the Baton Rouge Plant of Kaiser Aluminum & Chemical Corporation

Stay-dry FOAMGLAS insulation beats humidity, prevents corrosion on process tanks and vessels

Four years ago FOAMGLAS was installed on various process tanks and vessels at Kaiser Aluminum & Chemical Corporation's Baton Rouge, Louisiana plant. They needed a moisture resistant insulating material which could withstand high and rapidly changing humidity.

Because FOAMGLAS *stays dry* it was installed on hot water tanks and sodium aluminate process vessels varying in capacity from 2000 to 400,000 gallons. The moisture-proof structure of FOAMGLAS is giving *constant insulating protection* and is effectively preventing corrosion . . .

despite the severe humidity conditions. Because it's fireproof FOAMGLAS is also providing an added safety factor.

These benefits and more can be *yours* when you insulate vessels, piping, equipment or buildings with long-lasting, *stay-dry* FOAMGLAS. Write for full details. We'll be happy to send you a free sample and our latest literature pertinent to your needs.

Pittsburgh Corning Corporation

Department CP-76, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ontario

You can easily prove that FOAMGLAS *stays dry* by making this simple test. It and five other equally simple tests will quickly demonstrate the combination of properties that make FOAMGLAS the perfect solution to your insulating problems. Write now for a free sample and complete testing directions.



Also manufacturers of PC Glass Blocks

When inquiring check 6542 opposite last page

Schaefer Solved Caustic Soda Packing Problem

with **CHEMPRO** Lubricated Seals

BEFORE installing Chempro Lubricated Seals, the F. & M. Schaefer Brewing Co., Brooklyn, N. Y., experienced high packing and shaft replacement costs on their caustic soda pumps. Although carefully screened, minute particles of grit, aluminates from labels, and pulverized glass were carried back to the pumps. These highly abrasive particles lodged between the shaft and packing, not only chewing up the packing after a few weeks, but causing severe scoring of the shaft, necessitating frequent shaft replacement.

The first Chempro Style WLC Lubricated Seals were installed on Schaefer's caustic soda pumps in May, 1955, and have given more than 12 months of leak-free service. A Chempro Flushed and Lubricated Seal installed in December, 1955, on an Ingersoll-Rand Type 3GRVL pump has given the same trouble-free service in pumping highly abrasive caustic soda and diatomaceous earth solutions for reprocessing in a filter press.

Chempro Seals are giving highly economical service on pumps handling acids, alkalis, solvents and other chemical liquids and slurries under a wide range of operating conditions. Our engineers will be glad to recommend the Chempro Seal to meet your particular needs.

Advantages: Completely Interchangeable with Packing
Simple in Design • Chemically Inert Chempro Teflon[†] Packing
Low Power Costs • External and Internal Seals Available
Arranged for Lubrication, Flushing and/or Conditioning.
Write for Seal Bulletin 551

*Patented

†duPont trademark

CHEMICAL & POWER PRODUCTS, INC.

The Original Fabricators of Teflon Packings and Gaskets

9 Broadway, New York 4, N. Y.

When inquiring check 6543 opposite last page

CORROSION CONTROL

Hydrofluoric, nitric acid withstood by fume system with Dynel overlay

Glass fiber laminate still in good condition after two years service

A polyester glass fiber laminate stack and exhaust hood installation at Wallingford Steel Co., Wallingford, Conn., has successfully withstood the corrosive action of hydrofluoric and nitric acid fumes for two years as a result of its Dynel surface veil. Fume system is used in connection with Wallingford's pickling process on stainless steel.

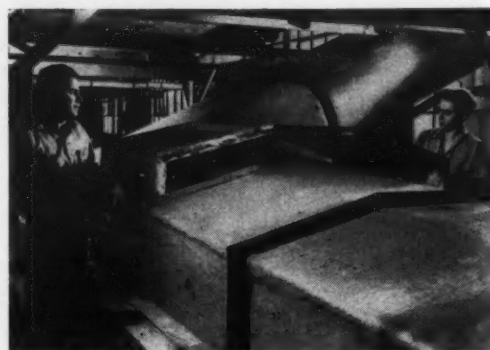
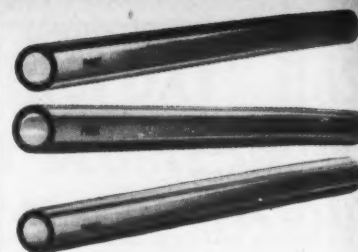


Fig 1 — Light weight of plastic exhaust system at Wallingford Steel makes removal for periodic cleaning a much easier job than with more conventional exhaust systems

Fume ducts and exhaust hood are constructed of plastic made with an overlay or surface veil of Dynel fabric on either or both sides of low pressure glass-reinforced laminates. Light weight of the plastic installation makes removal for periodic cleaning a much easier job than with conventional exhaust systems. With Dynel, the low pressure glass-reinforced laminates have exceptional resistance to chemicals, abrasion, and weathering.

Dynel is one of the most chemically resistant of the science fibers. It is produced from a copolymer of vinyl chloride and acrylonitrile. It is marketed in a variety of woven and non-woven fabrics in various weights suitable for laminate overlays. A 6-oz per square yard or less fabric is generally used in overlay work. These overlays are not designed to replace glass but rather to protect glass reinforced laminates and extend its use to additional applications.

Dynel gives an excellent wetting effect in applying resins. Even viscous resins thoroughly soak through heavy woven ducts of the material. Wetting quality is so thorough that overlay fabrics ac-



1 (for the gauge)
2 (for the shelf)
3 (for that emergency extra)

Don't be caught in a gauge glass shut-down.

Order 2 spares for every gauge glass you have. Then you have a ready replacement for routine use. The spare *spare* you use to hurry back into production should a glass go accidentally.

Protect yourself from replacement delay. Look ahead and avoid emergency.

Remember: "ONE FOR THE GAUGE AND TWO FOR THE SHELF." And always specify hard-to-break CORNING®, PYREX® and MACBETH® gauge glasses. It's the economical way.

CORNING INDUSTRIAL GLASSWARE FOR EVERY JOB

| Application | Recommended Product |
|---|---|
| Normal Conditions (Up to 100 p.s.i.) | CORNING brand standard gauge glasses |
| Higher temperatures | PYREX brand high-pressure gauge glasses |
| Higher pressures | PYREX brand heavy-wall gauge glasses |
| Extra visibility | PYREX brand red-line gauge glasses |
| Heavy-duty service | MACBETH brand flat gauge glasses |
| Viewing inside furnaces, reactors, pressure vessels, etc. | PYREX brand sight glasses |
| Lubrication inspection | PYREX brand lubricator glasses |
| Visible discharge devices | PYREX brand oil cup glasses |



CORNING GLASS WORKS

Corning, New York

Corning means research in Glass

When inquiring check 6544 opposite last page

CHEMICAL PROCESSING

tually become transparent when resin is poured on them. Fabric holds sufficient resin on surface to eliminate the need of gel-coats where they would otherwise be required. Application and mold curing time are decreased. Dynel also permits the formation of a smooth resin coating over outside surface of glass.

Dynel has a tensile strength of 40,000 to 57,000 pounds/square inch and a very low moisture absorbency of less than 0.4%. Material is extremely chemical resistant to both acids and alkalis. In one typical test (Fig 2) two chips were immersed for six days in a 10% solution of hydrochloric acid at 90°C. All glass laminate came out rough and porous while Dynel-covered chip showed deterioration only along the edges where the glass was not protected by the overlay. This can be highlighted by submerging such test chips in ink.

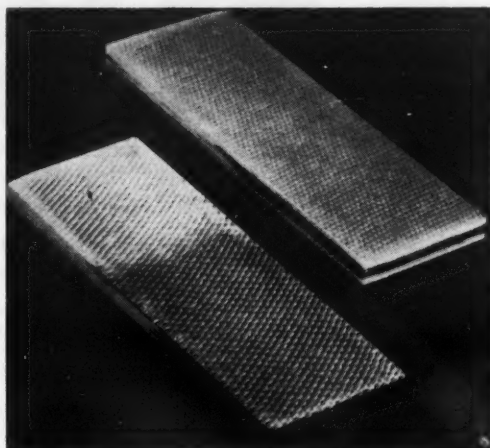


Fig 2 — After immersion in 10% HCl for six days, all glass laminate on left is rough and porous while Dynel covered chip shows deterioration only along edges where glass is not protected by overlay

Without Dynel, the chip rapidly wicks up ink while the chip covered with the fabric shows no absorption on its protected surfaces. Dynel fabric overlays are being used for low-pressure applications of glass reinforced polyester, phenolic, or epoxy resins.

(Dynel is product of Textile Fibers Department, Carbide and Carbon Chemicals Company, Union Carbide and Carbon Corporation, Dept. CP, 30 East 42nd St., New York 17, New York . . . or for more information about manufacturer's product, reader may simply check 6545 on the convenient Reader Service slip opposite last page.)

(Fume System at Wallingford Steel was made by Pla-Tank Division, Haveg Industries, Inc., Dept. CP, 54 Waltham Avenue, Springfield 9, Massachusetts . . . or for more information about manufacturer's product, reader may simply check 6546 on form opposite last page.)

Hard faced

WITH STELLITE

to resist seat wear

...at no
extra cost!



GP Globe Valve-Series 800

Stubborn resistance to valve seat wear, due to erosion, corrosion and galling, is built into Vogt GP valves with Stellite faced seating surfaces used in conjunction with hardened discs and wedges. By an exclusive method, hard facing alloys are welded to the integral seat of globe and angle valve bodies and to the removable stainless steel seat rings of gate valves.

This important feature, available at no extra cost, assures operation economies and longer valve life. A catalog describing the complete General Purpose line of valves in sizes 1/4" to 2" will be sent on request.

Adv. No. 3 in a series describing the features of Vogt GP valves.



Write For Your FREE COPY of Supplement No. 1 to Catalog F-9. Address Dept. 24-FCP.

HENRY VOGT MACHINE CO.
P. O. Box 1918 • Louisville 1, Kentucky

SALES OFFICES:

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DROP FORGED STEEL

VALVES

When inquiring check 6547 opposite last page

WHAT THERMOCOUPLE WIRE
IS BEST FOR CORROSIVE,
HI-TEMPERATURE CONDITIONS?



"Ceramo" WIRE, IT ALSO HAS
FAST RESPONSE—
UNUSUAL DURABILITY.

Wherever corrosion and high temperature conditions exist you're likely to find "Ceramo" thermocouple and extension wire in use. "Ceramo's" special construction—thermo elements and inert metallic oxide insulation encased in a seamless metal sheath—is ideal for these tough jobs.

For a given application enclosed "Ceramo" thermocouples last longer and respond faster than T/C's of conventional construction—and can withstand pressures up to 40,000 psi! Choice of sheath materials includes type 316 Stainless Steel and many others—with temperature ratings reaching 2100° F. "Ceramo" thermocouple extension wires can be used at high temperature without conduits—and without contamination of conductors. Basically rigid, "Ceramo" can be bent on a radius as small as its own diameter. And those diameters are really small!—just .032" O.D. for single conductors; .040" O.D. for duplex conductors.

"Ceramo" Thermocouple Wires made in Iron-Constantan, Copper-Constantan, Chromel-Alumel, Chromel-Constantan and Platinum Rhodium-Platinum from 36 to 16 gage. Sheathing: Stainless Steels, Inconel, aluminum or copper. Overall diameters: 1/25" to 1/4".

"Ceramo" Thermocouple Extension Wires made in Iron-Constantan, Chromel-Alumel or Copper-Constantan of 20 and 16 gage. Sheathing: copper-nickel alloy, plain or galvanized cold-drawn steel. Overall diameter: 1/8" and 1/4".

Learn more about this versatile wire.

Write for bulletin 31-300-R.

Thermo Electric Co., Inc.
SADDLE BROOK, NEW JERSEY

In Canada—THERMO ELECTRIC (Canada) Ltd., Brampton, Ontario

CORROSION CONTROL

Adhesion of vinyls improved with intermediate primer . . .

product contains polar groups which hook on to other paint surfaces

Uses: To insure a solid bond for finish vinyl coats.

Features: Primer contains polar groups, the effect of which is to act as bonding hooks to other paint surfaces.

Description: Formulation of the primer, like the finishing coat, is based on a vinyl copolymer, but differs in its chemical structure. Primer acts as an adhesive between the recommended etch-action wash-primer and the chemical-resistant vinyl finish coat.

A certain amount of chemical resistance is sacrificed in the primer, but this is considered unimportant since the finish coat takes care of this factor.

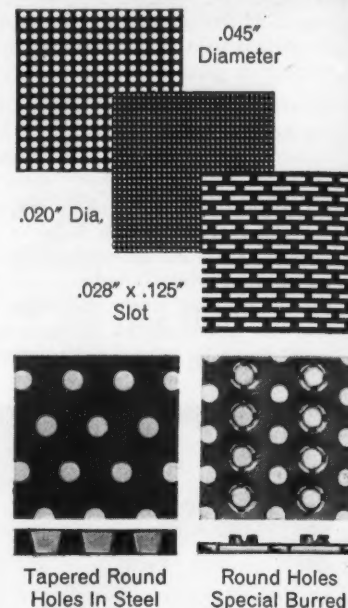
(Acanal Intermediate Primer is product of The Garland Company, Dept. CP, 3748 E. 91st St., Cleveland 5, Ohio . . . or for more information check 6549 on form opposite last page.)



"Didn't the fellows tell you? We have a machine for that, Miss Hurlbut!"

Credit Clair D. Wickman, The Upjohn Co., Kalamazoo, Mich., for the above cartoon.

H & K Perforated Screens CORROSION RESISTANT MADE FOR LONG LIFE



We are well-experienced in the perforating of screens in stainless steels, monel metal and other alloys.

Screens can be cut to shape or size with margins or unperforated areas as required. Perforated screens can be furnished in practically any material from foil thin to 1" thick.

Contact either H & K office or one of our agents. We will be glad to work with you on your perforated screen requirements.

FILL IN AND MAIL
COUPON TO OFFICE
AND WAREHOUSE
NEAREST TO YOU.



THE Harrington & King PERFORATING CO.

Chicago Office and Warehouse 3636 Fillmore Street
Chicago 44, Ill. New York Office and Warehouse 110 Liberty Street
New York, N. Y.

Please send me—

- ☐ GENERAL CATALOG NO. 62
- ☐ STOCK LIST of Perforated Steel Sheets
- ☐ SAMPLES of Perforated Plastics and Paper
- ☐ PRICE INFORMATION (NOTE: Send specifications of perforated materials wanted. If necessary send drawings or sketches.)

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____

When inquiring check 6550
opposite last page

CHEMICAL PROCESSING

When inquiring check 6548 opposite last page

Another fighter against corrosion — lead-clad aluminum . . .

product used to advantage in defense program available for chemical applications

Recent introduction of lead-clad aluminum, which has been used to advantage in defense applications, provides a material of considerable value to the chemical processing industries. One typical use for the material is for fabrication of equipment for heating or cooling corrosive liquors.

Lead is clad to base metals to add corrosion resistance of lead to the physical strength or conductivity of the other metal used. When failures ultimately take place after long service, they are usually fatigue failures caused by flexing of the bonded lead cladding. Since the expansion and contraction of aluminum and lead under temperature changes are almost identical, it is believed that lead-clad aluminum will overcome this disadvantage present with some other types of lead-clad materials. Also, aluminum presents less hazard to certain products or processes than some other metals.

(Lead-clad aluminum is product of Knapp Mills Incorporated, Dept. CP, 23-15 Borden Ave., Long Island City 1, N.Y. . . . or for more information check 6551 on form opposite last page.)

Data on wrought iron fittings and flanges

Wrought iron welding fittings and flanges described in four-page folder are known for their ability to resist corrosion and fatigue failure. Resistance to corrodents is attributed to purity of base metal, freedom from segregated impurities, and embedded glass-like slag fibers. Typical applications are illustrated in folder.

Bul-TT787 is issued by Tube Turns, Division of National Cylinder Gas Co., Dept. CP, Louisville 1, Ky. When inquiring specify 6552 on form opposite last page.



don't look now —

. . . but this magazine you are reading, **CHEMICAL PROCESSING**, comes to you without subscription price. Why?

Read what the Editors say on page 118.

Corrosioneering News

Quick facts about the services and equipment Pfaudler offers to help you reduce corrosion and processing cost.



Published by The Pfaudler Co., Rochester, N.Y.

Get continuous centrifuging in your continuous processes

For continuous removal of solids from one or two liquids . . .

For continuous concentration of solids by removal of liquid from slurries . . . and discharge of solids in a predetermined dry state . . .



It is no longer necessary for your centrifuging to be an expensive and time-consuming "batch" type operation.

While rotating at full speed, the Titan Superjector Centrifuge discharges solids deposited within the centrifugal bowl and thus cleans itself.

How it works

A simple yet unique design enables the Superjector to work automatically like no other centrifuge.

Solids are discharged through peripherally placed slots. These slots periodically are opened and closed by a telescopic action actuated by hydrostatic pressure. This pressure is built up by centrifugal force.

The concentration of solids and clarity of liquid produced can be adjusted within wide ranges. Solids can easily be concentrated to as low as 40% moisture content. Liquids can be rendered crystal clear.

If you can see uses for such an automatic centrifuge in your operations, write for your free copy of Bulletin No. 930, "Titan Superjector Centrifuge." Or ask your Pfaudler representative for details.

Now—fastest drying of corrosive products with Pfaudler dryer-blender

How do you go about drying highly corrosive products in your plant?

If you're not using a Pfaudler conical glassed steel dryer-blender you may be spending too much time and money on this process.

4-day drying yield ready in 7 hours... reported one user making product containing acid halides. Filling and emptying the Pfaudler conical glassed steel dryer-blender is quick and easy. It has a 1½ foot diameter opening for filling and a single 8 inch discharge nozzle for the 4 ft. and 6 ft. units.

Most of the labor cost and time previously spent handling trays of vacuum dryers is saved.

When in use, the dryer slowly revolves, tumbling its contents and quickly providing an evenly blended, evenly dried product.

These structural features built into the unit make it your fastest and most economical tool for drying and blending highly corrosive products:

- Solid one-piece construction of inner vessel for maximum strength, greatest corrosion resistance and easiest cleaning.
- Space between inner vessel and spherical portions of jacket heads insures effective drying with no waste of heat.
- No joints or clamps to break up the drying surface area. This heated surface area is maximum; therefore drying time is shortest.



At Eastman Kodak Company this Pfaudler dryer-blender, used for drying a corrosive organic halide, has reduced time required by previous methods (4-6 days) by 75%.

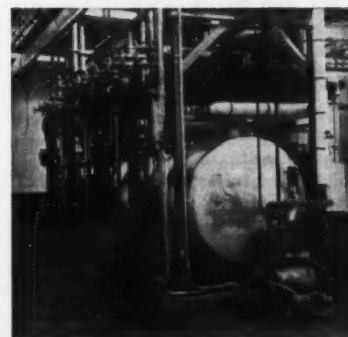
• Vacuum exhaust tube is located up and out of the product while the unit is in operation. There it is able to remove vapors most efficiently.

Dries acids and alkalis

You can use Pfaudler conical dryer-blenders for every acid except hydrofluoric and for alkalis up to pH12 at 212° F. Thus you get the same flexibility you are already familiar with in Pfaudler glassed steel reactors.

These dryers range in volume up to 165 cu. ft. working capacity. They are available in four different diameters: 2 ft., 4 ft., 6 ft., and 8 ft. Internal pressures may range from full vacuum. Each unit is tested to meet ASME code specifications. Write for Data Sheet 26.

How Sylvania heats, cools four separate solutions to ±1° accuracy... in one system



The problem at Sylvania Electric Products, Inc. was to find a system that would hold four different solutions to within 1° F. of a predetermined temperature. These solutions may be required for use between 55°

and 70° at any time, and are supplied at anywhere from 38° to 78° F.

Thus, the system must either heat the solution or cool it. It must also vary the degree of heating or cooling. It must switch from heating to cooling, depending on change of set point.

Now in operation at Sylvania's Seneca Falls, N. Y. plant is the Pfaudler system shown (left). It does all the thermal gymnastics mentioned, and still holds to within 1° accuracy on all four solutions.

This system, completely designed and equipped by Pfaudler, includes heat exchangers, all control valves, the heating equipment, refrigeration equipment, automatic controls, panel board and all auxiliary equipment. It is typical of the type of project engineering Pfaudler now offers.

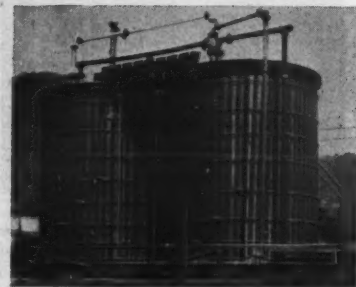
When inquiring check 6553 opposite last page



News

Wherever CORROSION RESISTANCE is a Factor

HAVEG PLASTIC TANKS MEET EVERY SERVICE REQUIREMENT



HAVEG STORAGE TANKS, REACTORS, COLUMNS, TOWERS, PLATING TANKS, FILTERS and similar equipment are now manufactured in every type and size, rectangular and cylindrical—in a wide range of Haveg grades, combined with selected chemically inert materials to provide exceptional resistance to corrosive acids, hypochlorites, salts, alkalies and various oxidizing agents.

HAVEG PLASTIC TANKS are tough and durable. Large Haveg storage tank installations have been in continuous service at leading processing plants as long as twenty-five years—under the most extreme corrosive conditions.

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You can make anything in Haveg that you can make from metal. Haveg is tough, durable, machineable, easily and quickly altered or repaired in the field.

Haveg Bulletins F-7 and C-13 give detailed data on the complete line of corrosion resistant Haveg process equipment and resin cements to solve every corrosion problem. Write for your copies at no obligation.

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When inquiring check 6554 opposite last page



recent technical papers

Here are condensations of pertinent technical papers on corrosion control recently delivered before engineering groups or published in technical transactions. Additional technical papers selected by our staff as being particularly helpful in the battle against corrosion will be condensed for publication in the Corrosion Control section of future issues.

chromate inhibits attack on metals exposed to brines intermittently

GEORGE E. BEST and JOHN W. MCGREW
 Mutual Chemical Division
 Allied Chemical & Dye Corporation

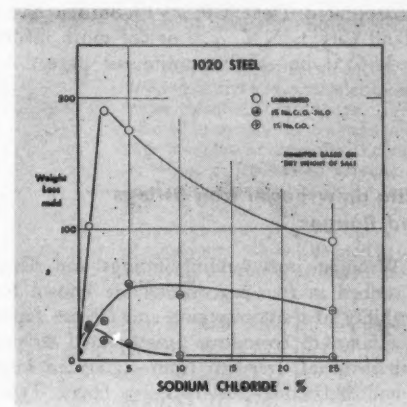


Fig. 1—Inhibitor effectively minimizes attack, particularly at the higher pH value obtained with sodium chromate

Recent research work shows that the addition of chromate effectively minimizes corrosive attack on metals intermittently exposed to sodium or calcium chloride brines. Although use for preventing corrosion of metals under continuous exposure to refrigerating brines is one of the earliest commercial applications of a chemical inhibitor, little has been published about the effectiveness of inhibitors under conditions of discontinuous exposure.

In this testing program, metal panels were held between pairs of thin plastic hexagons mounted on a shaft rotated at 1 rph in brine solutions to make specimens alternately wet and dry. Tests were made using both sodium chromate and sodium bichromate as inhibitors with both sodium chloride and

calcium chloride brine.

Attack on SAE-AISI 1020 steel by either sodium or calcium brine was greatest in the vicinity of 2.5% brine strength. At this concentration, calcium chloride was more corrosive than sodium chloride. At higher concentrations of 10 and 25%, sodium chloride brine was more corrosive than calcium chloride.

Chromate was compared to bichromate as a simple and practical means of testing the inhibition afforded by hexavalent chromium at different pH levels. For ex-

ample, on one test, results of which are plotted on Fig 1, chromate gave a pH of 7.8 whereas bichromate dropped the pH to 5.3. Bichromate could have been used throughout tests, with alkali added for conversion to chromate whenever desired. This was not done because in operating practice the user has option of applying either chromate or bichromate. Where large amounts of inhibitor are involved, lower unit cost of bichromate, either with or without alkali, can be a determining factor in selection.

Addition of 1% sodium chromate — based on sodium or calcium chloride solids — effectively minimized corrosive attack on the 1020 steel. A like amount of sodium bichromate, at lower pH, was less effective, but moderated corrosion considerably. Less hexavalent chromium was consumed in the case of chromate. Accordingly, on both counts, inhibitor was more efficient at the higher pH level.

Types 2S and 3S aluminum were not significantly corroded by sodium chloride at any brine strength. Type 75S was attacked at a low rate and 0.5% chromate was adequate to stifle it.

Magnesium R and FS-1 alloys differed from both steel and aluminum in that corrosion generally increased as brine strength increased. Calcium chloride was more corrosive than sodium chloride, while R alloy was more susceptible to attack than FS-1 alloy. Addition of 0.5% or more chromate afforded nearly complete protection.

(Condensed from technical paper, "Inhibiting Corrosion of Steel, Aluminum, and Magnesium Intermittently Exposed to Brines," which was presented at the 1956 Annual Meeting of the National Association of Corrosion Engineers in New York City.)

(For more information on chromium chemicals for inhibiting corrosion contact Mutual Chemical Div., Allied Chemical & Dye Corp., Dept. CP, 99 Park Ave., New York, N. Y. . . . or check 6555 on form opposite last page.)

five epoxy formulations are designed to do specific jobs

A. G. STERNBERG, Technical Director
Steelcote Manufacturing Company

Five basic coating formulations in the epoxy group, which has come into prominence lately due to its excellent corrosion resistance, follow: Each formulation is designed to do a specific job.

(Please turn to next page)

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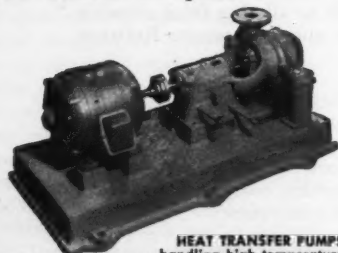


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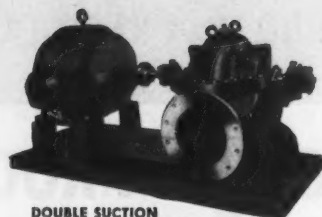
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When inquiring check 6557 opposite last page

Recent Technical Papers

(Continued from preceding page)

- 1—Epoxy esters
- 2—Epoxy amines
- 3—Epoxy polyamides
- 4—Epoxy ureas
- 5—Epoxy phenolics

1—Epoxy esters are the most common one-package systems. They dry well and speedily, according to amount of epoxy resin present. When well formulated, they have excellent resistance to detergents, mild acids and alkalis, aromatic and aliphatic solvents. Hard, yet flexible surface resulting has good adhesion.

2—Epoxy amines are probably the most widely produced of the two-package types. One package contains the amine curing agent and the other the epoxy resin. Coating air-dries in two to six hours but does not develop chemical resistance for about a week. Speed of cure may be increased by raising temperature. Epoxy amines are best known for their resistance to all solvents except the chlorinated type. They have excellent resistance to other chemicals as well. They are more brittle than epoxy esters or polyamides, but will withstand high impact and more than normal abuse on structural steel.

3—Epoxy polyamides are noted for their hard, durable, and flexible films and are the most versatile of all the epoxy groups. This is also a two-package system. Material has excellent chemical resistance. Coating has withstood the action of sun and rain for long periods without crazing. Material has been used for coating wet concrete with very good results.

4—Epoxy ureas can be furnished in one package. It gives a flexible film which resists chemicals and abrasion even when the film is as thin as 1/3rd mil. Adhesion is extremely good.

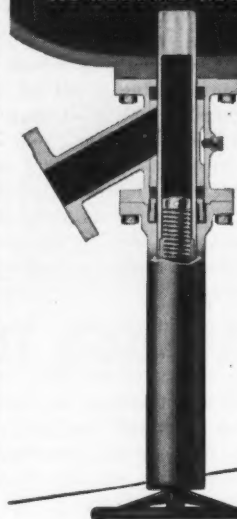
5—Epoxy phenolics combine the alkali resistance, flexibility, and adhesion of the epoxys with the acid resistance and hardness of the phenolics. Unfortunately, the poor color of the phenolic is also transmitted. This type is one of the most chemical-resistant of all organic coatings available today. It is used for such extreme service as lining tank cars for transporting corrosives. Material must be cured at a relatively high temperature, near 400°F.

Excellent results have been obtained by the use of a zinc-pigmented epoxy finish against the bare steel, then placing a good coating over this. Zinc has a powerful anti-corrosive sacrificial anode effect. Then a top or finish coat can be applied, mainly for decorative effect.

(Condensed from address delivered in Denver before the Rocky Mountain Chapter of the National Association of Corrosion Engineers on Feb. 17, 1956.)

(For more information on epoxy finishes contact Steelcote Mfg. Co., Dept. CP, 3418 Gratiot St., St. Louis 3, Mo. . . or for more information check 6558 on form opposite last page.)

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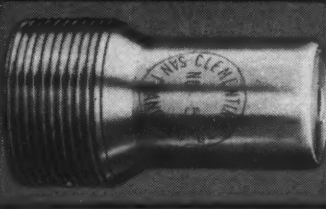
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New York 13, U. S. A.

When inquiring check 6559
opposite last page

CHEMICAL PROCESSING

Users Report:

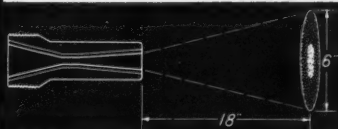
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opposite last page

recent technical papers

copper and iron kept low in feedwater through use of neutralizing amines

J. D. RISTROPH, Chief Chemist
Virginia Electric and Power Co.

E. A. YORKGITIS, Research Engineer
Hall Laboratories, Inc.

Results of recent research work conducted at the Chesterfield Station of Virginia Electric and Power Co., Richmond, Va., show that boiler tube failures caused by corrosion products can be prevented through the use of neutralizing amines. With either morpholine or cyclohexylamine fed to deaerator outlet, pH of condensate was maintained at 9.0 to 9.1. In each case, Fe and Cu concentrations were kept at very low values—less than 0.01 ppm.

Comparison of morpholine and cyclohexylamine was made on No. 3 Unit at Chesterfield Station. Each amine, in turn, was fed continuously to deaerator outlet to a pH close to 9 in hot-well condensate. After a period of stabilization, comparative data on copper and iron pickup were obtained. Samples were taken at nine different points in system.

The low level of copper and iron may be due in part to other factors besides addition of amines. Oxygen contamination is probably most important of these other factors. Although it is not known what iron and copper pickup would be without treatment to raise the pH, earlier data showed appreciably greater pickup of these metals at a pH only 0.4 below the 9.0 to 9.1 level.

Good sampling facilities and reliable analytical procedures were used. Of particular importance was the continuous flow of samples, solubilization of Fe and Cu in the sample, and use of sensitive indicators such as bathophenanthroline and neocuproine in determinations of metallic contaminants.

(Condensed from technical paper, "Controlling Iron and Copper Pickup with Neutralizing Amines," which was published in "Transactions of the ASME" for February 1956, pages 287-297.)

(For further information check 6561 on form located opposite last page.)

Corrosion Keys — Aluminum

Data by R. S. Dalrymple of Reynolds Metals
starts on page 80

Impervite
IMPERVIOUS
GRAPHITE



"We consider this unit as representing a major innovation for a practicable solution to corrosive heat exchanger problems."

Chief Engineer
Courtaulds (Alabama) Inc.

CROSS BORE HEAT EXCHANGER

ANOTHER EXCLUSIVE DEVELOPMENT OF FALLS INDUSTRIES INC.



- Accommodates 150-200 psi operating pressures
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- Unaffected by action of all corrosives except few high oxidizers
- Design simplicity eliminates major maintenance
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Design simplicity and heavy duty construction of IMPERVITE CROSSBORE heat exchangers consist of only 3 parts: (1) one-piece, fully floating heat transfer cylinder, (2) one-piece transfer dome, and (3) shell with required nozzles and mounting brackets.

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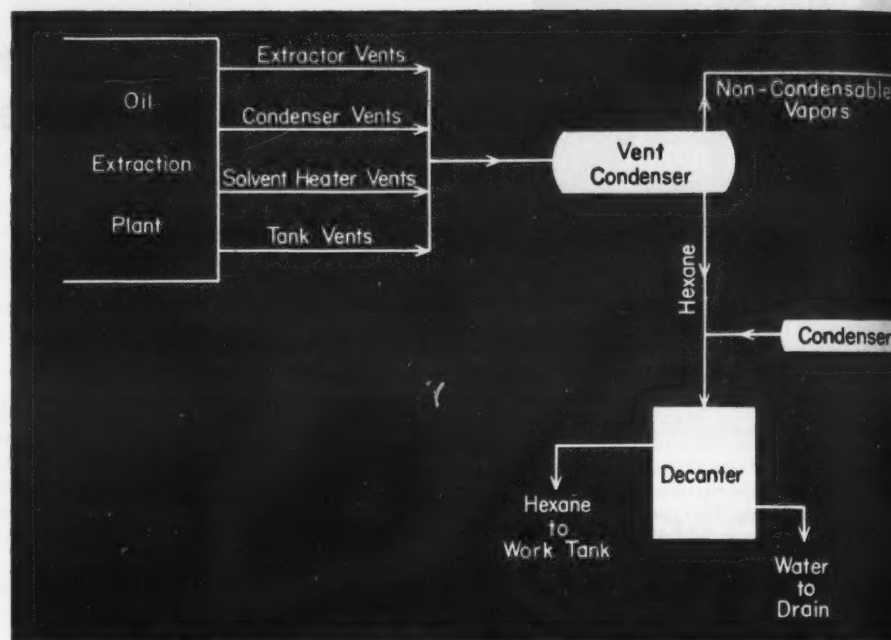
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ideas — from other industries and nuclear field ...
new trends in research, processes, services



Activated-charcoal solvent recovery system
in soybean oil extraction plant . . .

recovers over 99.7% hexane

Solvent flow in plant is better than
5000 gal per hour

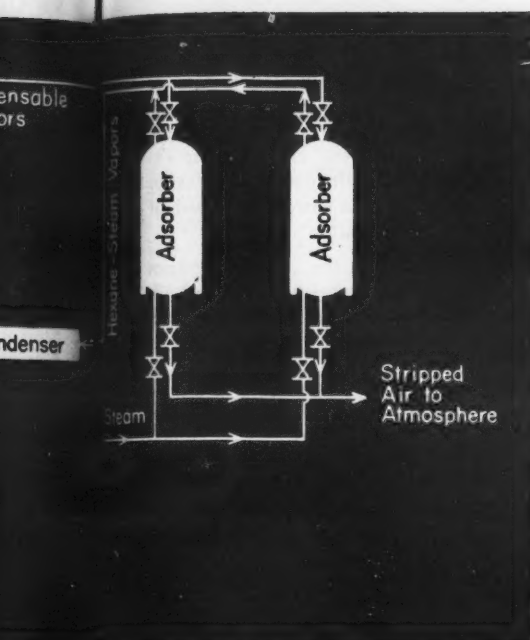
TED F. MEINHOLD, Assistant Editor
With **DELMAR D. WALKER**
Extraction Plant Superintendent
Funk Bros. Seed Co.

One of the newest and most modern soybean oil extraction plants in the Midwest is the Funk Brothers Seed Company at Bloomington, Illinois. Placed in operation in 1952, the plant processes over 300 tons of soybeans per 24-hr day. Extraction is accomplished by counter-current washing of the flaked beans with hexane. Although the rate of solvent flow is better than 5000 gph (ratio of 1.1 lb hexane per lb soybeans), the solvent loss averages less than 0.3%. With hexane costing them about 18 to 22c a gal, this means that solvent loss is kept below \$80 a day.

Most of the credit for this low loss goes to the activated-charcoal solvent-recovery system installed in the plant. Although plant operating rate has increased 50% since original start-up, no changes or alterations of the recovery system have been necessary. It has continued to recover better than



Adsorbers remove over 99% of hexane vapors from air stream. Units operate individually, each having a four-hour adsorption cycle

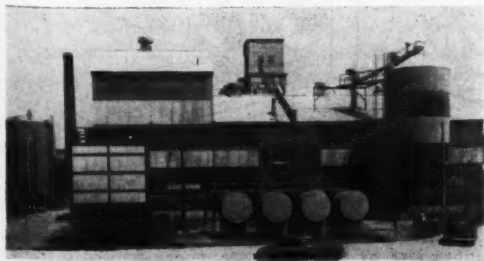


Flow diagram of hexane recovery system in soybean oil extraction plant, Bloomington, Illinois

99.7% of the hexane. The high recovery, of course, also results in safe working conditions and avoids the problem of air pollution.

Plant follows conventional procedure of taking the mixture of hexane and oil from the counter-current washing and separating the two components by evaporation and vacuum distillation. The large percentage of the hexane absorbed and retained by the beans is then recovered by passing the bean flakes through a desolventizing unit where the solvent is evaporated and recovered by condensation. Additional hexane evaporates during various other processing stages, each of which must be vented to prevent pressure build-up and accumulation of non-condensable gases (mostly air).

(Please turn to next page)



Exterior view of Funk Bros. soybean oil extraction plant. Tanks in center contain shift production of finished soybean oil



EVEN THIS IS TOO MUCH!

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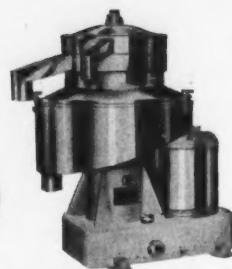
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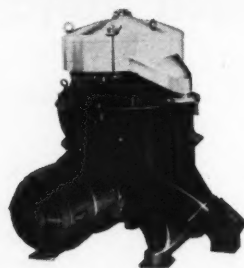
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IDEAS

Solvent Recovery System

(Continued from preceding page)

The real efficiency of the processing plant depends on recovering the hexane vapors which are impossible to recover in the conventional water-cooled condensers. All vents in the extraction process, including the desolventizer condenser vent, are therefore exhausted through the activated-charcoal system. Latter consists of two adsorbers, each containing a bed of hard, granular activated charcoal.

As the hexane-laden air from the vent lines passes through the adsorber, the charcoal picks up and adsorbs better than 99% of the hexane vapors present in the air stream. When the adsorber reaches the end of its four-hour adsorption cycle, the air stream is switched to the other adsorber. The saturated unit is regenerated by introducing low-pressure steam, which causes carbon to release its accumulated hexane. Released vapors are condensed, separated from the accompanying water, and returned to storage — ready for reuse in the extraction process.

(Activated-charcoal solvent-recovery systems are product of Barnebey-Cheney Company, Dept. CP, North Cassady Avenue, Columbus 15, Ohio . . . or for more information reader may simply check 6566 on the convenient Reader Service slip which is located opposite last page.)



"All I did was ask her to help me with the 'Gurley' smoothness tester!"

Cartoon idea by R. W. Metcalfe, of the Antioch Division of Fibreboard Products Inc., Antioch, Calif.

**Get over 80% of oil from wells
by thermal secondary
oil recovery . . .**

process uses underground combustion to raise temperature of formation, makes oil flow easier

Recent tests conducted with thermal method of secondary oil recovery indicate that the new process may result in over 80% of the original oil well content being recovered. Process is based on the idea of heating the oil-carrying formation to lower the viscosity of the oil, thereby making it flow easier. Basically, all the heat required to raise the temperature of the formation can be developed by surface equipment. However, it has been found that definite economic advantages can be obtained by permitting underground combustion to occur.

Gas engine-driven equipment

Equipment used consists of an air compressor, a gas compressor, and a water pump — all of which are driven by a gas engine. Compressed air and gas are injected into a combustion chamber where the fuel is burned at a high temperature. Water, initially used as chamber coolant, is later injected into the lower part of the chamber, producing a hot gas-steam mixture. This mixture, varying in temperature between 400 and 900°F, is injected directly into injection wells at 350-400 psi.

Tests have shown that at temperatures considerably less than 400°F, combustion begins spontaneously if some free oxygen is present. Therefore, all that is necessary to start combustion is to add oxygen to the injected mixture. As the temperature of the formation increases, oil viscosity decreases. Driving gases, introduced at injection wells, move the hot oil to production wells where it is extracted to the surface.

Tests took about two years to complete and were conducted at the Parker Pool in Clark County, Illinois. They were performed by the Worthington Corporation, Harrison, N. J., in cooperation with the Forest Oil Corporation, Bradford, Pa. A total of 5210 bbl of oil was produced by six wells from a formation which previously had shown little natural production.

50% of injected gas recovered

Approximately 50% of the injected gas was recovered from the production wells — the rest escaped into the field. About 10% of the original oil content burned underground. No pumps were used to extract the produced liquids to the surface — the fluids were lifted by the produced gas which had been driven through the formation. The produced liquids were collected in a manifold and flowed to a gas collector, water separator, and storage tanks.

(Condensed from paper prepared by Richard Garbus, Project Engineer, Worthington Corporation, Department CP, 426 Worthington Avenue, Harrison, New Jersey.)

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When inquiring check 6568 opposite last page

IDEAS

ASQC concludes 3-day course on use of "Box" method of experimentation

A three-day course was recently held at the Harvard Business School, Boston, Mass., on application and use of the "Box" method of experimentation. Instruction was by Dr. J. S. Hunter of the American Cyanamid Company, who wrote his doctoral thesis at North Carolina State College working under G. E. P. Box, Imperial Chemical Industries, who originated the technique. The course was sponsored by the Chemical Division of the American Society of Quality Control.

The Box method is essentially an improved technique for dealing with a basic experimental problem — providing a systematic procedure for quantitatively determining the influence of operating conditions upon a process and quickly arriving at the optimum combination of operating conditions with a minimum of experimentation. It is based on the recognition that no chemical process is a clean straight-line relationship of a response, say yield or purity, to a number of processing variables.

Data are obtained in such a way that it is possible to develop an adequate mathematical description of the process and thus determine which combinations of relevant variables will give optimum operation. Using a few strategically-placed experiments, researchers can find the answers that they are looking for: maximum yield, purity, minimum cost, etc. Another advantage of the method is that it can be used by persons who have not had advanced training in mathematics.

(Information courtesy of the Chemical Division of the American Society of Quality Control, Dept. CP, 161 W. Wisconsin Avenue, Milwaukee 3, Wisconsin.)

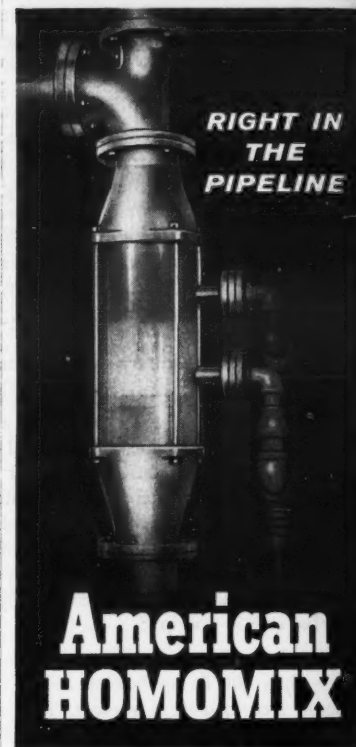
Well planned photo darkrooms can raise plant efficiency

... this twenty-page booklet tells how. Used by engineering, research, production, testing, and maintenance departments, photography can be a vital service. Carefully planned photo darkrooms are of extreme importance in getting the maximum benefits from photography.

Details of darkroom design — location, layout, equipment, ventilation, electrical and structural notes — are covered in this illustrated 6 x 9" booklet. A number of floor plans are given.

"Darkroom Planning Handbook" is issued by Calumet Manufacturing Co., Dept. CP, 6550 N. Clark St., Chicago 26, Ill. When inquiring reader may simply check 6569 on the convenient Reader Service slip which is located opposite last page.

CONTINUOUS LIQUID, GAS OR SLURRY CHEMICAL MIXING



**American
HOMOMIX**

**Gives instant, uniform,
complete mixing
without a mixing tank**

Saves space, time and equipment. Simplifies and speeds the blending of one or more chemicals. Permits a wide range in the percentage of additives to base fluid and assures accurate, economical mixing control. Any number of diffusing stages can be selected. Provides for visual inspection of the mixing operation and access to diffusing impeller. Can be equipped with lift stage. Can be made of standard or special material and protectively coated. Easily installed in vertical, horizontal or inclined position. Wide range of sizes and capacities from 1 GPM to 15,000 GPM.

Send for Technical Supplement HM or for details on your application.

(Patented)



IN OUR 88TH YEAR

AMERICAN WELL WORKS

Mixing, Pumping, Water & Waste Treatment Equipment

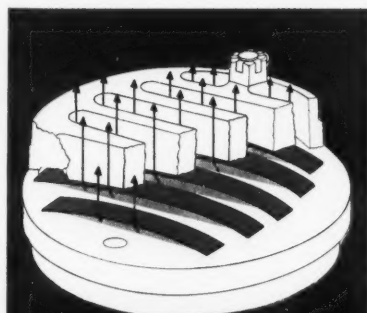
150 N. BROADWAY, AURORA, ILLINOIS

Sales Offices: Chicago, New York, and other principal cities

When inquiring check 6570
opposite last page

CHEMICAL PROCESSING

This compressor valve works with no impact for longer life, best efficiency



Stainless steel strips, in red, open the Feather Valve ports by rolling contact against the lower plate. There is no impact.

The Feather* Valve is the lightest, simplest, quietest compressor valve ever developed. Flexible strips of stainless steel open and close the valve ports with a gentle rolling contact. There is no destructive impact . . . even when the valve is operating as fast as forty times a second.

This lack of impact assures long life and negligible maintenance. The valve itself is all but indestructible. Absence of buffer plates and cushioning devices give it extreme simplicity.

The Feather Valve is quiet and reliable because of its lightness and tight contact seating. Valve action is very sharp. There is virtually no slip or back flow. As a result, you get minimum valve loss and use minimum power.

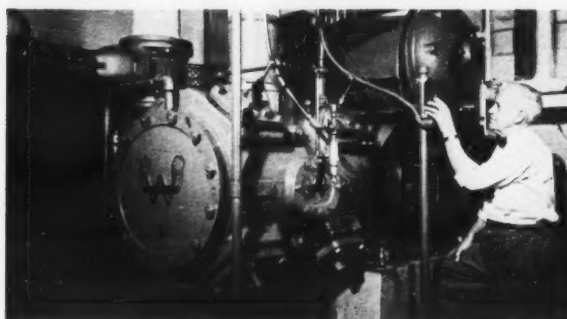
To get the utmost in performance, be sure you specify Worthington when you buy your next compressor. Worthington Corporation, Harrison, N. J. K.6.2

WORTHINGTON

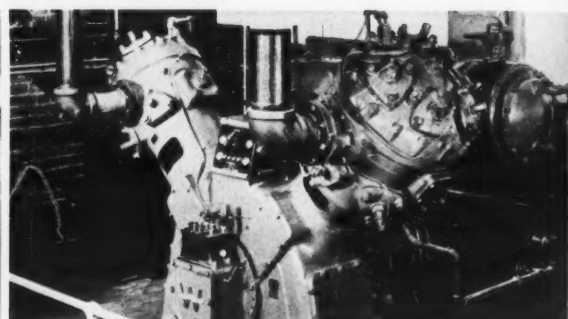


*Reg. U. S. Pat. Off.

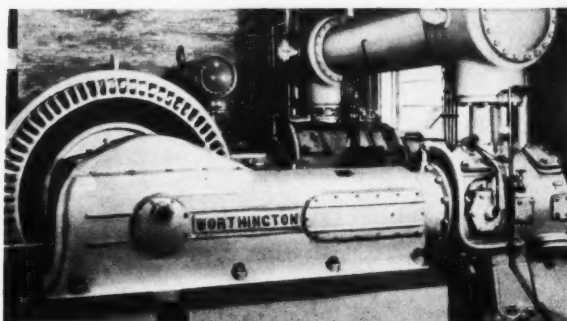
No compromising machine selection with this complete compressor line



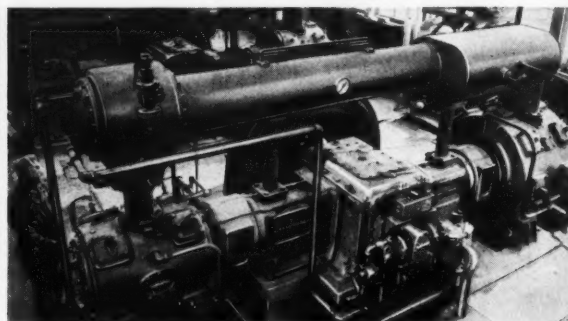
Single-stage compressor, type HB. For economical, continuous supply of air in smaller quantities. Sizes range from 10 to 125 hp. (Bulletin L-640-B1C)



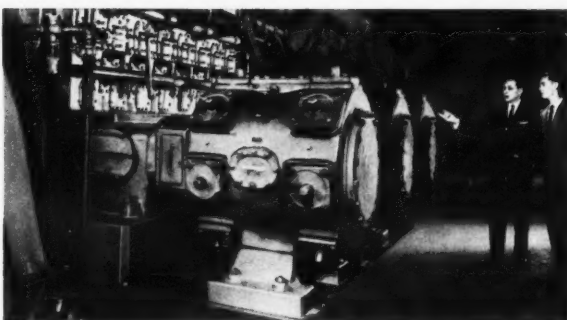
Two-stage angle compressor, type YC. Most compact unit for its capacity. Available up to 250 hp, and in larger sizes in similar type DYC. (Bulletin L-676-B1A)



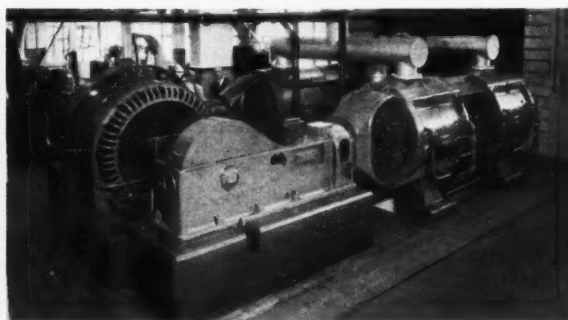
Horizontal duplex compressor, type DC-2. A two-stage compressor designed for heavy-duty service. From 250 to 3,000 hp. (Bulletin L-675-B1B)



Balanced opposed compressor, type BDC. Versatile—ideal for either multiple or single-service applications. Sizes from 300 to 10,000 hp. (Bulletin L-679-B1)



SUTC gas-engine compressor. Most complete process flow flexibility with 2-cycle compactness. Available in ratings from 750 to 2,500 hp. (Bulletin S-550-B23D)



Vacuum pump. This Worthington "compressor in reverse" provides pressures as low as .25 psia. Available in sizes from 10 through 2,500 hp. (Bulletin L-600-B9-4)

A compressor and drive for your every compression job is available in the standard Worthington line. Sizes range up to 10,000 hp, air and gas pressures to 35,000 psi. For more information about any of these Worthington compressors, write to Section K64, Worthington Corporation, Harrison, N. J. In Canada: Worthington (Canada) 1955, Ltd., Toronto, Ont.

WORTHINGTON



K.6.4

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**Evaporation cut 45 percent
in water reservoirs by use
of hexadecanol**

Field tests conducted in Australia by Dr. W. W. Mansfield of the Commonwealth Industrial and Scientific Research Organization of Australia indicate that water evaporation in reservoirs can be reduced 45 percent by the use of hexadecanol. Only 2.2 pounds of the substance was needed to cover a 320 acre reservoir with an evaporation-retarding film for a period of 6 weeks. Current cost of the chemical is in the neighborhood of 50 cents a pound.

The material is used in pellet form. These are placed in small floating boxes which have gauze windows. The boxes are anchored at various locations in the reservoir. Tests showed that even a very thin (one ten-millionth of an inch) film of the relatively insoluble material on the water surface is unaffected by waves, dust, or motorboats. Fish, plants, and animals are reported to be unaffected.

(Condensed from paper presented by Dr. W. W. Mansfield at the First International Conference on Water Evaporation, sponsored by the Southwest Co-operative Research Project on Reservoir Evaporation Control and the Southwest Research Institute, Dept. CP, 8500 Culebra Rd., San Antonio 6, Texas.)

**Describes aluminum nameplates,
and fastening accessories**

Aluminum nameplates and accessories for applying them are described in two two-page catalog sheets. Nameplates can be applied to crinkle, uneven, or curved surfaces by use of heat- or solvent-activation.

"Therma-Cal" catalog sheets are issued by North Shore Nameplate Inc., Dept. CP, 214 Northern Blvd., Bayside 61, N.Y. Specify 6571 opp. last p.

as you read
**chemical
processing**

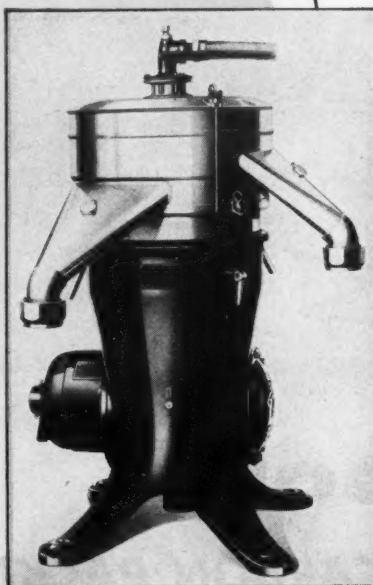
... you may be wondering why you have been selected to receive it regularly ... without subscription charge.

The Editors explain on page 118.

For more information on product at left, specify 6572 ... see information request blank opposite last page.

STRAIGHT LINE

...shortest distance to profits!



Why separate with slow, roundabout filters or settling tanks—when you can use a time-saving, profit-making *straight-line* method? ... De Laval Centrifugals!

Many of the most efficient chemical and food plants find that De Laval Centrifugals make separation a *continuous* process, eliminate production bottle-necks, cut costs.

They have discovered that De Laval Centrifugals—whether used for separation, clarification or concentration—quickly pay for themselves ... frequently improve the product by doing a better job.

Get the facts on what De Laval Separators and Clarifiers can do for you ... now!

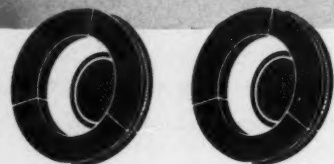
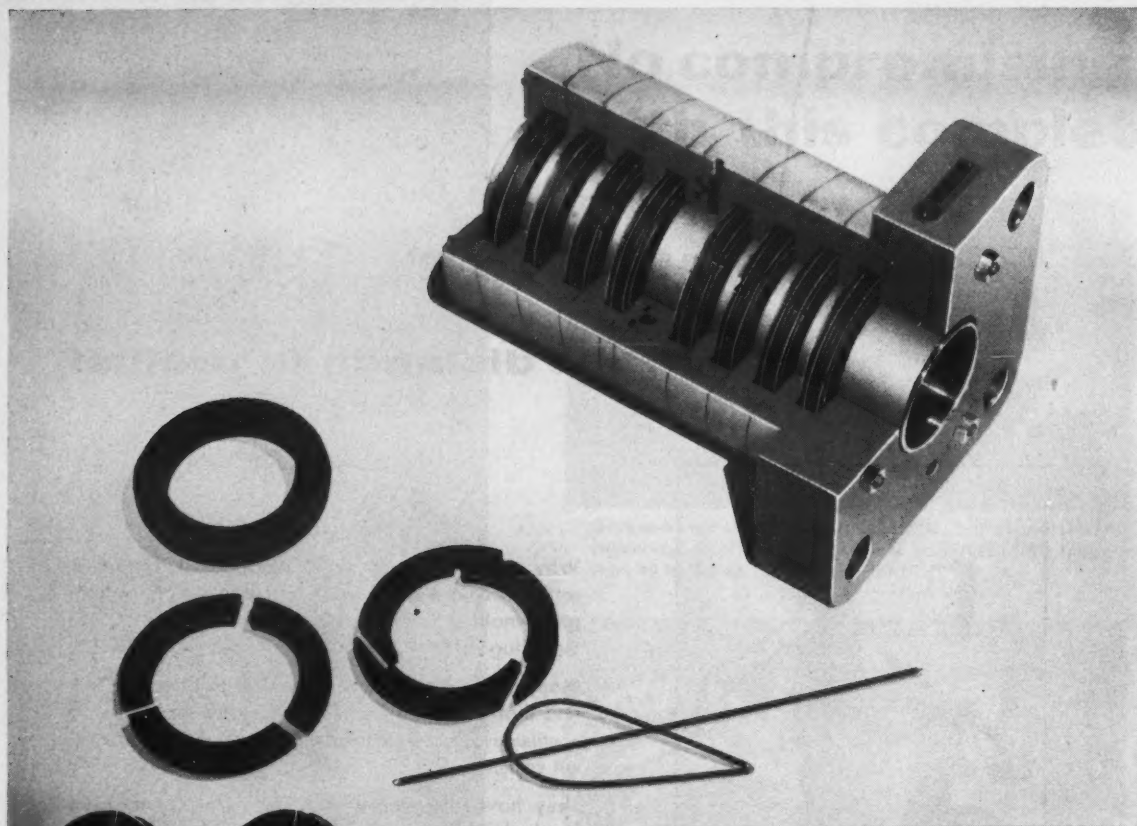


DE LAVAL

for faster processing systems

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

When inquiring check 6573 opposite last page



Look to **COOK**

for Better Non-Lubricated CARBON PACKING

COOK carbon packing rings are made of a special carbon graphite material that automatically assures you *high resistance to wear, chemical inertness and excellent heat conductivity.*

COOK Rings in any case make for a better seal—but when placed in a Cook case assure

you the perfectly engineered carbon packing. If you have sealing requirements for non-lubricated compressors, write today for a sample carbon ring, plus literature on Cook's complete line of packing materials. Address C. Lee Cook Company, 916 South Eighth Street, Louisville 3, Ky.

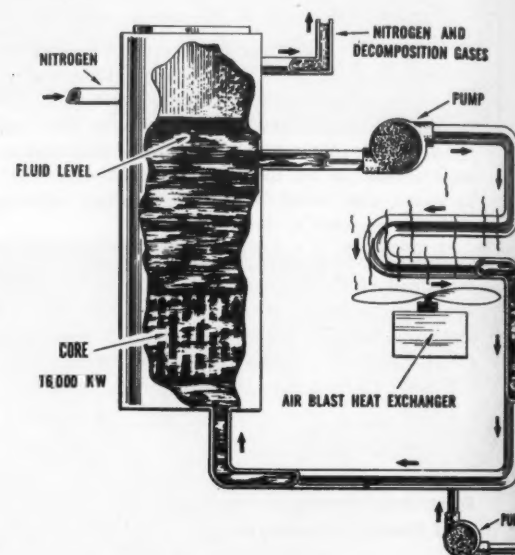
**C. LEE
COOK
COMPANY**

Sealing Pressures Since 1888

When inquiring check 6574 opposite last page

IDEAS

ORGANIC-MODERATED REACTOR EXPERIMENT

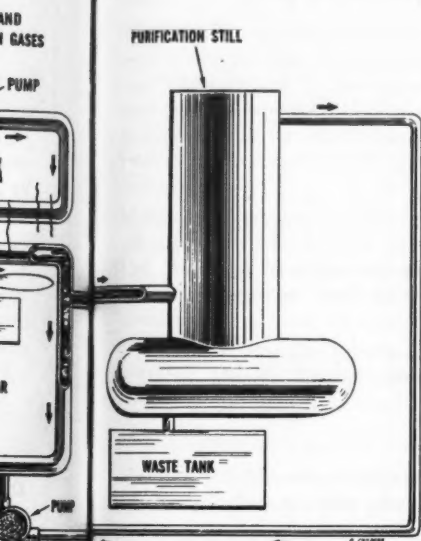


As part of its program for developing economic nuclear power, the AEC is teaming up with Atomics International in construction and operation of an organic-moderated reactor experiment (OMRE). Scheduled to be in operation by early 1957, the experiment will involve an expenditure of \$1.8 million. Atomics International will bear about \$750,000 of this. Reactor will be built at the AEC National Reactor Testing Station in Idaho.

An organic material, such as diphenyl, will have the dual role of moderator-coolant in the reactor system. As moderator, the material will slow down neutrons produced in the fission process, helping to sustain the chain reaction. As a coolant, the liquid will circulate through the reactor core—absorbing the heat and carrying it to heat exchangers.

Reactor will be designed to generate 5000 to 15,000 kilowatts of heat. Present plans do not call for conversion of this heat into electricity, as the program will be concerned only with technologies associated with the reactor itself. Reactor will use fuel elements

Private industry and AEC combine efforts, share expenses on \$1.8 million project for finding ways to lower cost of producing electricity from nuclear fuel



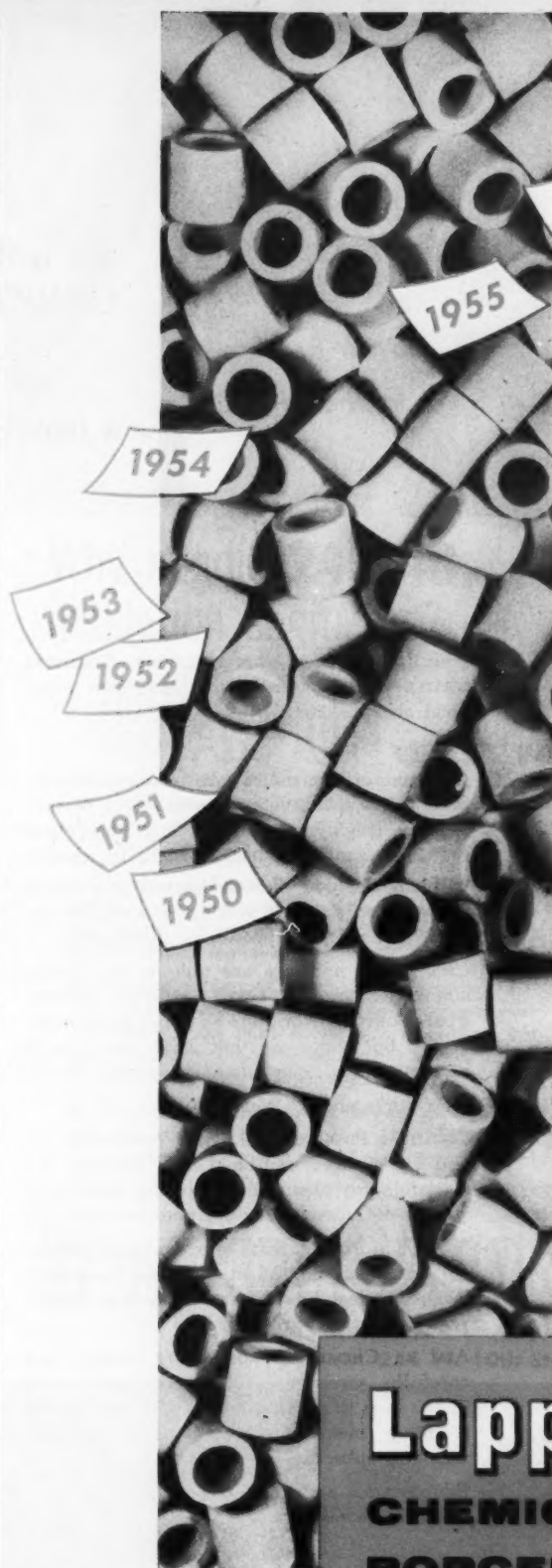
Organic-moderated reactor being built at AEC National Reactor Testing Station will use liquid diphenyl as moderator-coolant. Heat output will be from 5000 to 15,000 kilowatts

highly enriched in uranium-235.

Use of an organic compound such as diphenyl offers several potential advantages: 1) high hydrogen content makes it an excellent moderator; 2) high boiling point makes reasonably high temperature systems possible without use of high pressures; 3) material causes negligible corrosion with standard materials of construction; 4) it does not react readily with uranium; and 5) becomes only slightly radioactive upon exposure to nuclear radiation.

Problems to be solved are concerned chiefly with effect of heat and radiation on the organic coolant. They tend to cause the liquid to deteriorate. Primary purpose of the OMRE is to determine the irradiation and thermal stability of organic coolants under conditions found in a prototype power reactor.

(Organic-moderated reactor is being designed and built by Atomics International, a division of North American Aviation, Inc., Dept. CP, Canoga Park, California.)



Lapp
CHEMICAL
PORCELAIN

LONGER CONTINUOUS SERVICE

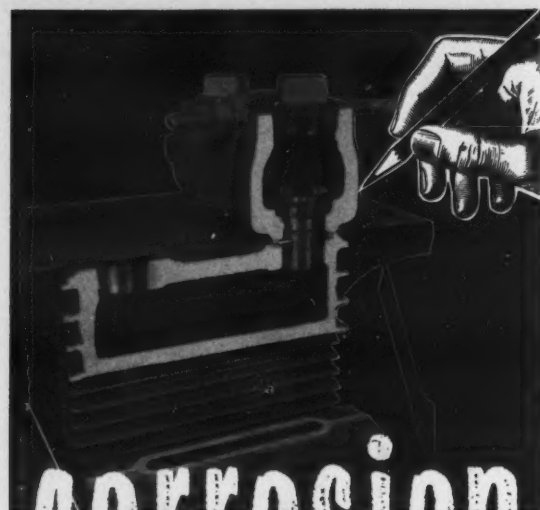
...WITH LAPP PORCELAIN RASCHIG RINGS

Lapp Porcelain Raschig Rings are your best bet for Process Tower packing for two important reasons ... purity and strength. Lapp raschig rings are non-porous, completely vitrified and iron-free. They are chemically inert to acids of all concentrations (except hydrofluoric), will not crumble and will not absorb liquids which could later contaminate the product being processed.

As for strength, Lapp raschig rings are dense, hard and close-grained. They are tougher against damage from handling and tower operation than other ceramic rings or other packing shapes. Because Lapp rings are so strong and inert, they seldom need replacement. Hundreds of satisfied customers back up our claim of longer continuous service—with real savings. Get the full story on Lapp Chemical Porcelain—see for yourself how this initially low-cost material can save you money while providing a sounder processing system.

WRITE for our bulletin containing description and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 817 Wendell St., Le Roy, New York.

When inquiring check 6575 opposite last page

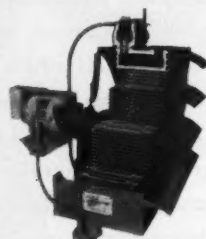


CORROSION

EXTERNAL—from contaminated air

INTERNAL—from electrolytic action

ends—



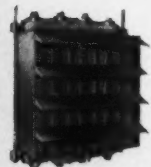
When your unit heaters are GRID cast iron construction. Here's why—

GRID heating sections and headers are made of high-strength cast iron . . . *no external corrosion from acid fumes.* All metals in contact with steam are similar . . . *no electrolytic action internally . . . no internal corrosion.* GRID construction ends your unit heater maintenance problems — because GRID will operate on steam pressures up to 250 lbs. P.S.I. . . 450° temperature no pressure-reducing valves needed. No soldered, brazed, welded or expanded connections . . . a specially designed threaded nipple provides a leak proof joint (see illustration).

GRID design gives you maximum heating performance because — GRID provides more air changes at lower outlet temperature . . . carefully selected motor speeds and fan capacities positively deliver warm, comfortable air in ample volume to floor level . . . no wasted heat through stratification.

GRID installations save you money as GRID requires no maintenance . . . is practically self-cleaning (note wide fin spacing in illustration). GRID provides long service life . . . units installed in 1929 are still operating. No ordinary unit heater approaches GRID's record for continuous trouble-free heating service.

Get the complete story on GRID Unit Heaters, GRID Blast Heaters and GRID Radiation for chemical plant use. Write for your copy today!



**D. J. MURRAY
MANUFACTURING CO.**

MANUFACTURERS SINCE 1883

WAUSAU, WISCONSIN

When inquiring check 6576 opposite last page

*A letter
to our Readers
from the Editors*

DEAR READER:

As you have noticed, this magazine—CHEMICAL PROCESSING—is “different”—different from other technical chemical magazines.

For example —

- CP's editorial articles are concise, timely, practical. . . while other publications feature lengthy, highly specialized and theoretical material (similar to basics taught in school).
- CP comes to you without demand of a formal subscription price, if you are responsible for important chemical processing operations.
- CP's design and size are unique. It is large, almost as large as LIFE, SATURDAY EVENING POST, FORTUNE. Not quite as tall as those magazines, but wider—so that when you open it up you get a “cinemascope picture effect.”

Why this “difference”? Well —

- CHEMICAL PROCESSING is edited specifically for you experienced, seasoned men who are responsible for chemical processing operations . . . it is not intended for beginners or students.
- So its editorial contents *must* be “post-graduate”, practical, helpful in every-day executive work. It must be written for fast, profitable reading—for you are busy men.
- And so CHEMICAL PROCESSING's readers are carefully screened. . . “hand-picked”. . . to make sure the magazine reaches you “post-graduate” men. It's not simply sold “to those who will subscribe.”

We Editors must serve the “most of the best” readers.

This means, first we must always be in close touch with chemical processing developments throughout industry. We are constantly “in the field”, alert for news of developments, changes, of progress.

why is this magazine,
CHEMICAL PROCESSING, so “different”?

. . . and why aren't you required to pay
a subscription for it?

Then, we must write this vital news so you can read it with the minimum of effort, in the shortest time.

Finally, these vital news-articles must be made AVAILABLE to the greatest possible number of you men responsible for chemical processing operations.

*The “most of the best” cannot be reached
by simply serving “those who will subscribe.”*

Many of you readers are in widely scattered plants. And many of you are inaccessible. It costs a lot of money just to try to sell a subscription to you. And no matter how much money is spent trying, or what selling effort is exerted, there are many, many important men who simply do not subscribe.

So we “hand-pick” the best — and CHEMICAL PROCESSING is sent to these “most desired” readers.

How is this done?

First . . . we set up standards . . . that is, ratings of firms, type of manufacturing, and titles or functions of individuals in such firms.

Next . . . CHEMICAL PROCESSING is sent only to those firms and those individuals that qualify under these rigid requirements. That is what “hand-picked” means.

(How do we know these men read the magazine? Their response to editorial articles and advertisements in each issue . . . by letter and on the Reader Service Slip . . . answers that question.)

Doesn't all this cost a lot of money?

Of course it costs money. But it is the only way to insure reaching the greatest possible number of the most desired readers.

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And, actually, it's less expensive in some ways than it is to try to sell subscriptions.

For, you see, most business magazine publishers actually spend more to get subscriptions than the subscription price returns!!

Then why do such publishers keep on trying to sell subscriptions?

Well, there's an old postal law — passed way back in 1879 — which still gives a low postage rate on paid circulation (subscription-selling) magazines. Some publishers feel this "postal subsidy" is necessary.

We differ. We believe it is more important to give greater service than it is to save a little on postage. (You see, it is the advertising dollar that pays for a publication — not subscriptions. And, of course, only by effectively serving more "best readers" can a publication give top advertising values.)*

Moreover — no subscription price within reason could possibly pay for any good industrial magazine. Actually, to prepare, print and mail a good industrial magazine costs \$20.00 to \$40.00 (sometimes more) a year for each reader served. So you see, a subscription is no more than a "token payment" which qualifies some magazines for "postal subsidy."

Take another look at CP's unique format.

Starting with the front cover, please leaf through this issue. Note the big pictures, the "cinematic spreads." Here is an effectiveness in editorial — and in advertising — that can't possibly be obtained in the smaller sized magazines.

You see more — you learn more — more quickly — because of this unique format. And you'll find it "attractive", "interesting" — rather than dull, laborious reading such as one finds in a text book.

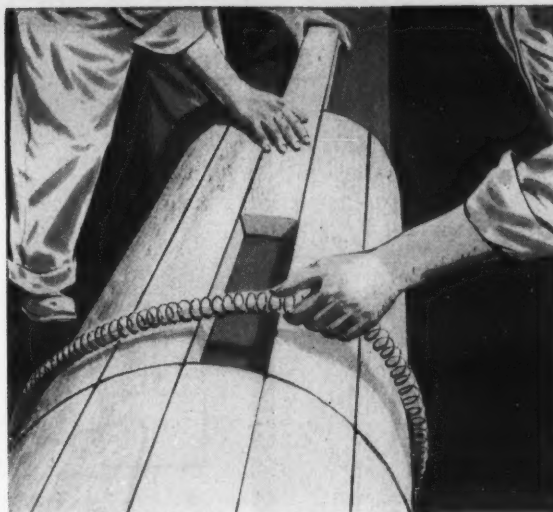
You'll note too that subjects are sectionalized — editorial and advertising on kindred subjects are grouped — making it easier to find what you are most interested in at the moment. And there is editorial content throughout the book — no "solid advertising sections."

★ ★ ★

These are some of the reasons why **CHEMICAL PROCESSING** is "so different." We believe these "differences" enable us to serve you better. We hope you find this true. Your comments, suggestions and questions are always welcome.

THE EDITORS
OF **CHEMICAL PROCESSING**

*This discussion of paid subscriptions does not apply to general or "mass" magazines . . . for general magazines and newspapers do not have this problem of "hand-picking" special readers . . . as they simply serve "people as people." Hence paid circulation methods do not handicap them as they do handicap technical or industrial magazines serving highly specialized groups.



Why handle **24,948**
insulation segments?...

SNAP*ON

GLASS FIBER PIPE INSULATION vs. segmental insulation — that was the question at an eastern refinery where more than a mile of 16" pipe and its accompanying steam tracer line required insulation. A comparison of Snap*On vs. segmental yielded the following information:

- Since Snap*On comes in one-piece 6' sections, the number of Snap*On sections would total only 1134. To do the same job with segmental insulation would have required handling and applying 24,948 curved segments 3' long.
- Because of Snap*On's flexibility, standard 20" one-piece sections could be used to cover both pipe and steam tracer lines in one easy operation. No special cutting, fitting or equipment would be required; not so with segmental insulation.
- Snap*On has the highest thermal efficiency of any pipe covering on the market. In addition, since joints between segments are a potential source of

heat loss, Snap*On's single joint construction gives it a decided thermal advantage, especially on large pipe sizes.

● Since Snap*On is almost immune to damage in transit, storage and application, no extra pieces would need to be ordered for breakage — and no allowance made for clean-up time. (You can readily estimate breakage and clean-up time required when using segmental insulation.)

But prove to yourself just how economical G-B Snap*On is by making similar comparisons in your plant whenever hot or cold piping from ¾"-33" requires insulation. In the meantime —

WRITE FOR FREE COPY OF NEW 8-PAGE BROCHURE

© Manufactured under U. S. Patent 2,742,240. Other patents pending.

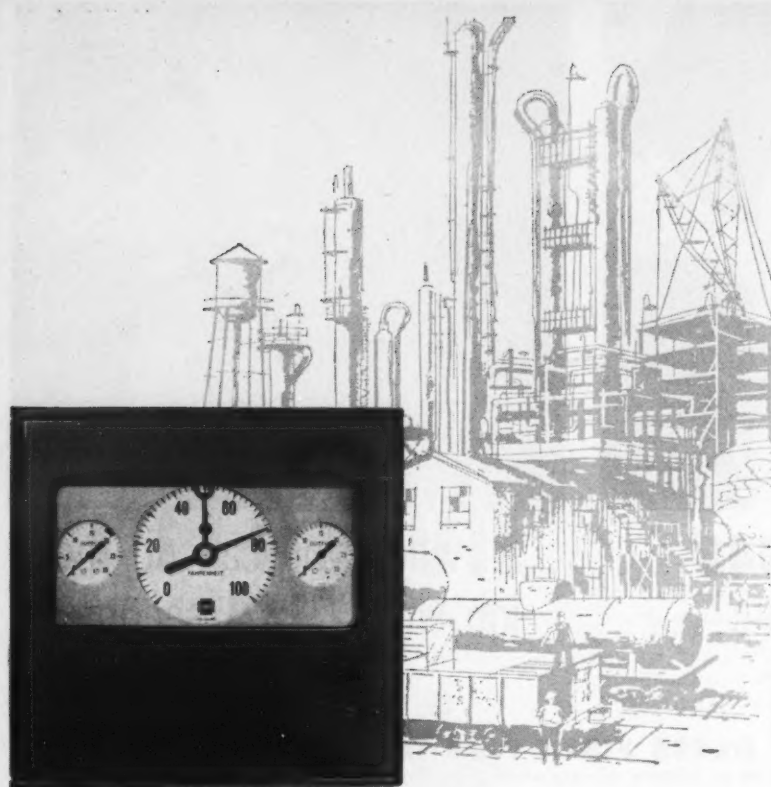
GUSTIN-BACON Manufacturing Company

Thermal and acoustical insulations • Molded glass fiber pipe insulation • Pipe couplings and fittings

254 W. 10th St., Kansas City, Mo.



When inquiring check 6577 opposite last page



PATENTS APPLIED FOR

NEW **USG** Temperature Pilot *with automatic reset*

**Temperature, Reset and Expanded Ranges
feature the enlarged U. S. Gauge line**

The exclusive USG indicating, mercury-actuated temperature pilot is available in ranges from -40°F. to $+1000^{\circ}\text{F.}$

Pressure and Temperature Pilots are available with or without automatic reset. When process conditions change, conversion kits make possible addition of automatic reset to existing installations.

With the new USG nested diaphragm pressure elements, vacuum and low pressure pilots never before available are now standard.

Only U. S. Gauge offers pressure pilots in ranges as low as 30 inches of water . . . as high as 10,000 pounds.

Write your valve supplier for complete details, or write us direct.

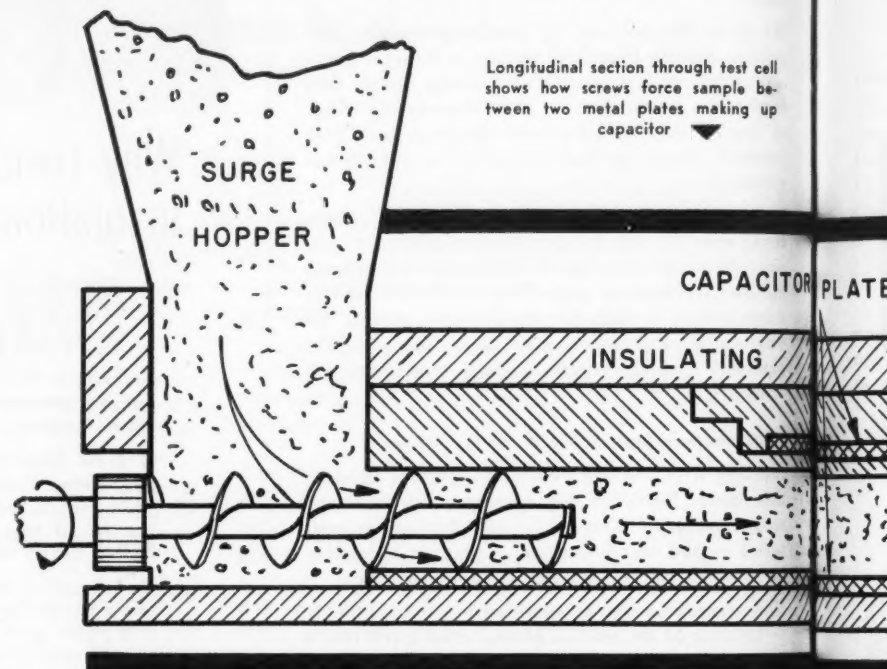
UNITED STATES GAUGE
Division of American Machine and Metals, Inc.
Sellersville, Pa.

Home of the **SUPERGAUGE**

When inquiring check 6578 opposite last page

Instrumentation & control

Schematic shows location of test cell
in capacitance bridge circuit



Longitudinal section through test cell
shows how screws force sample be-
tween two metal plates making up
capacitor

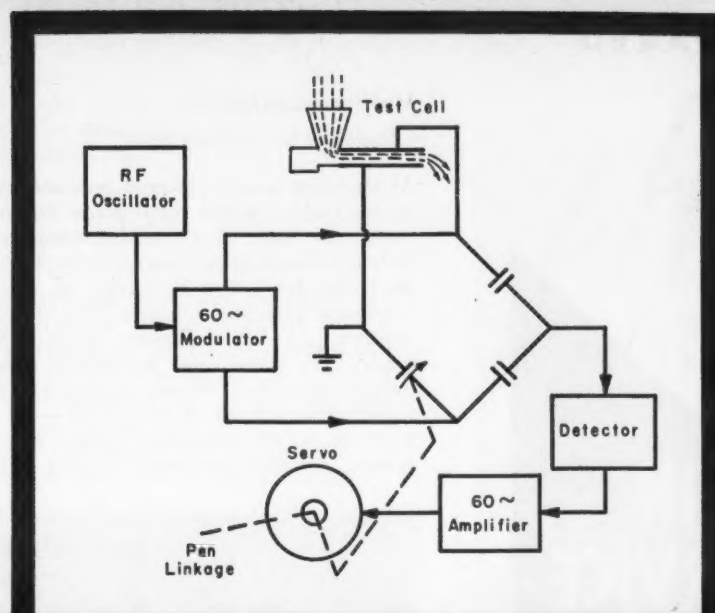
SAMPLES FLOWING STREAM

**Forced feeding of test cell maintains repro-
ducible conditions — accuracy of 0.2% of
moisture attained on granular solids**

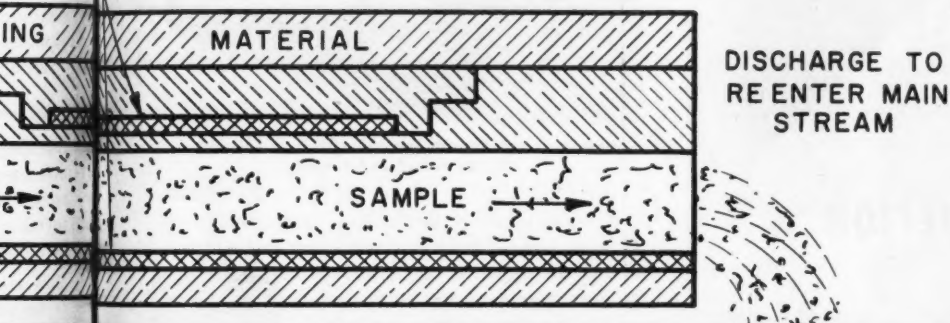
Uses: Indicates, records, and controls moisture content of free-flowing granular solids *continuously*. Full-scale commercial installations have confirmed accurate performance with corn products, hominy grits, whole grains, rolled oats, dry dog food, whole corn flour, and commercial mashes. Laboratory tests and successful plant demon-

strations have been run on soybean meal, linseed meal, polyvinyl chloride, lignin sulphonate, synthetic detergents, and other free-flowing solids of consistent particle size.

Factors affecting performance are variations of particle size distribution, nature of contained moisture (free or bound water), variation of salts content, or materials other than



PACITOR PLATES



RECORDS MOISTURE CONTENT

water with high dielectric constants (alcohol, for example) and metals.

Features: Moisture instrument is not used for spot checking — it is installed in a by-pass stream taken from flowing product. Sample is continuously forced through test cell and returned to main stream. Thus, it can be used to monitor drying performance, or to measure moisture content of large samples accurately.

Accuracy of the device itself is shown by test results of one typical material: sample was classified between No. 16 and No. 20 wire screens, variance in moisture reading

was $\pm 0.2\%$. Accuracy fell off slightly with same material classified between No. 14 and No. 24 wire screens.

Description: Moisture controller is based on the fact that free water has a dielectric constant of 80. Handbook values for dielectric constant of other common materials show most plastics in the range 2 to 4, alumina in the range 4 to 8, paraffin in the range 2 to 2.5. Thus it can be seen that adding water to a material increases its dielectric constant so long as the water remains in a free state.

(Please turn to next page)

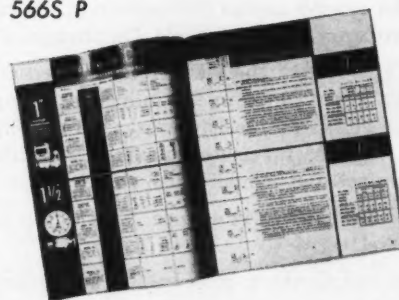
Three Neptune Meters Boost Production 200%



Less than half a minute of a man's time is required to measure three ingredients . . . corn syrup, liquid sugar, and water . . . into each batch of Nalley's table syrup. The operator simply pushes buttons on the Neptune Auto-Stop meters to set the pounds required by the formula, and opens the valves. The Auto-Stops shut off automatically . . . accurately . . . leaving the operator free to devote full attention to other details.

One man now produces more than three times as much as formerly was produced by five men handling bulk sugar and barreled corn syrup.

Ask for helpful
Meter Selection Book
566S P



This Auto-Stop batching meter is only one of many models and sizes of Neptune meters . . . ranging from meters with simple counters to electric switch adaptations and remote control systems . . . now handling more than 150 different industrial liquids. Sizes from 25 to 1000 gpm. Bronze construction. Telephone or write nearest branch for full details.

NEPTUNE METER COMPANY
19 West 50th Street, New York 20, N. Y.

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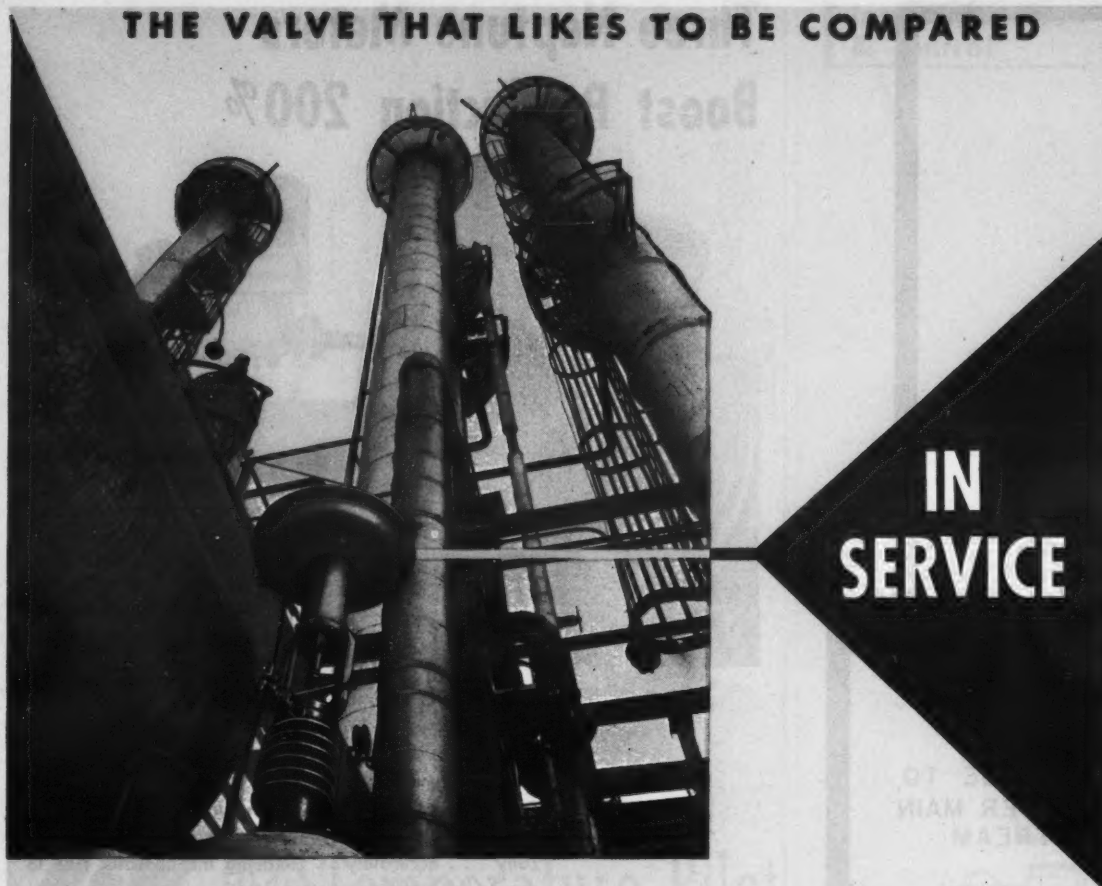
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When inquiring check 6579 opposite last page

THE VALVE THAT LIKES TO BE COMPARED



K&M design features and production standards prove out...

Kieley & Mueller always invites comparison . . . because comparison alone points up the superior value of K&M Diaphragm Control Valves.

First, compare response of the K&M fully molded diaphragm combined with the highest power factor in the industry. Compare the safety and convenience of the all steel topworks. And, compare materials, part for part . . . K&M furnishes—as standard without extra cost—more parts manufactured of high-finish costly alloys.

Then, compare K&M valves in service . . . side by side with any other diaphragm control valve.

Keep your own maintenance records . . . and your own records will tell the K&M story.

Send for your copy of the K&M Valve Data Catalog, Bulletin CV-53.

78th Anniversary . . . Oldest U. S. Pressure and Level Control Valve Manufacturer

diaphragm control valves

KIELEY & MUELLER, INC.

64 Genung Street • Middletown, New York

K&M

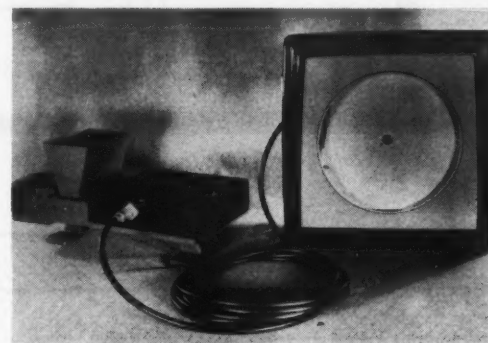
When inquiring check 6580 opposite last page

INSTRUMENTATION & CONTROL

Moisture Controller

(Continued from preceding page)

At the heart of this moisture instrument is a capacitor formed by two metal plates. One of these forms the floor of a chamber through which sample is forced by five augers. Top plate is insulated from the sample by a sheet of plastic. Differences in plate size minimize "end-effect" of the capacitor, and distance between plates is fixed by construction of the unit. With these values held constant, capacity of this set of plates is a function of dielectric constant of the sample — in turn, a function of the moisture content and "back-ground" dielectric constant of the dry material.



Material is fed through test cell at left to give continuous record and control

In order to measure this capacity, instrument is set up with a radio frequency oscillator and 60-cycle modulator. Signal entering capacitive bridge is a radio frequency carrier with a 60-cycle envelope.

Tracing operation of the instrument from an instant where bridge is balanced, higher moisture would increase capacity of test cell, causing less voltage to develop across it. Imbalance of bridge would cause a radio frequency signal to appear at the detector. Output of the detector (similar to a radio detector) would be 60-cycle ripple with amplitude proportional to imbalance. Sixty-cycle amplifier boosts this ripple to usable power to drive a servomotor. Conventional scheme is used to have servomotor position pen and a variable capacitor which brings the bridge back into balance at the new moisture reading.

Decreasing moisture content in the cell would cause imbalance in the other direction (180° out of phase). Servomotor would rotate in the opposite direction and again rebalance capacity bridge with the instrument reading a new moisture content.

Rates and Performance

Since portion of the main stream cut out for sampling is not destroyed, it might seem desirable to use a large sample. Sample size is limited, of course, by feed rate potential of the instrument. This rate is

from 100 to 200 pounds per hour. Thus, typical sample might be about 5% of the main stream in many solids handling operations.

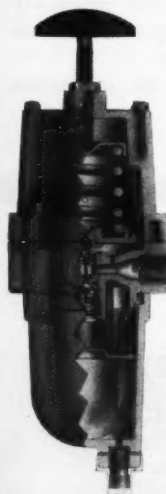
On one commercial installation, kibbled dog biscuit which classified between No. 5 and 8 wire screen sizes was measured continuously in such a sampling scheme. Accuracy was $\pm 0.15\%$ of moisture.

Recorder-controller can be installed remotely from a test cell. Electronic, it requires only 110v AC for electric (10 amp off-on) control. Proportional controls are also available for electric and pneumatic systems. Test cell measures $18\frac{1}{2}$ " long by 10" wide. It weighs 25 pounds exclusive of 1/3-hp 440v 3-phase motor to drive screws. Recorder-controller is a standard Fielden series 42RF capacitance bridge.

(Rogers Moisture Controller was developed and patented by The Mechanical & Electronic Products Div. of the Mechanical Research Dept., The Quaker Oats Co., Dept. CP, 205 Water St., Akron 8, Ohio. Check 6581 on form opposite last page.)

Regulates instrument airflow and has cellulose filter to clean it . . .

phenolic impregnated filter removes particles as small as 40 microns



Regulator is hand-adjusted

Uses: For close regulation of instrument air supply in pneumatic instrumentation.

Features: Air regulator has phenolic impregnated cellulose filter to remove particles exceeding 40 microns in size.

Description: Body of air regulator is die cast aluminum alloy with stainless and plated steel components. Air regulator can be supported by its piping only, although screws are provided for panel or bracket mounting if required. Regulator can be serviced without removing from air lines.

Connections are $\frac{1}{4}$ " pipe. Maximum input pressure is 300 psig. Maximum output pressure is 40 psig; 100 psig with special spring. Drain valve for filter will operate when regulator is in either a vertical or horizontal position. Only three holes are required to mount on panel board: one $\frac{13}{16}$ " in diam, two holes $\frac{7}{32}$ " in diam, two inches apart.

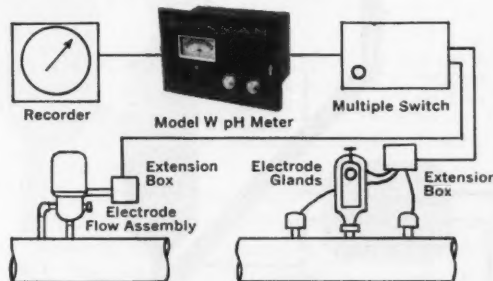
(Type 73-26 Air Regulator is product of Black, Sivalls, & Bryson, Inc., Dept. CP, 7500 E. Twelfth St., Kansas City 26, Mo. Check 6582 opp. last page.)

pH UNDER PRESSURE



With cover attached

With cover removed



TYPICAL PRESSURIZED HOOK-UP. The Flow Assembly is installed into a sample or by-pass line, the Gland Assemblies directly into the main process line when a by-pass line is not practical. The Multiple Switch provides a means of monitoring up to six separate electrode assemblies with a single Model W pH Meter. A Recorder-Controller will automatically control the process to keep streams at a constant pH factor.

The Beckman pH Flow Assembly is equipped with a *pressurized electrode* which allows you to get accurate pH measurements in process streams under pressure. A small pressure differential is maintained on the specially-developed reference electrode to prevent the process solution from contaminating the electrode and to keep the KCl liquid in the electrode flowing freely at the correct rate. Beckman Flow Assemblies are in use where solutions are moved about under pressure (chemical, petroleum), where sterilization is necessary (food, pharmaceutical), in large tanks and vessels where hydrostatic head or a variable liquid level is a problem. To learn how pH control may be applied to your process, mail the coupon today. Beckman Instruments, Inc., Process Instruments Department, Fullerton, Calif.

The Beckman Flow Assembly consists of these 5 elements:

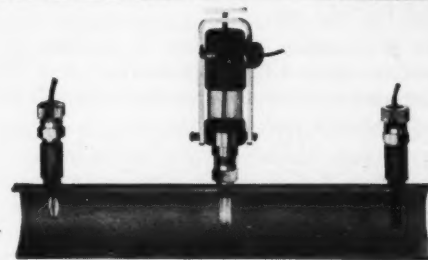
1 PRESSURIZED REFERENCE ELECTRODE operates efficiently in pressures up to 100 psi. The electrode's large reservoir holds plenty of KCl and amount of liquid can be visibly checked at all times.

2 BECKMAN GLASS ELECTRODE is dependable, accurate and virtually unbreakable.

3 THERMO-COMPENSATOR is a resistance element that makes a true pH reading possible regardless of temperature changes (range from 32° to 212° F.).

4 CAST ALUMINUM BODY prevents damage to electrodes. The leak-proof cover protects the unit from moisture and permits installations indoors or out.

5 STAINLESS STEEL FLOW CHAMBER resists corrosion from elements in the process stream.



THE GLAND ASSEMBLIES consist of the same elements (electrodes and thermo-compensator) and may be installed in a main process line with pressures up to 100 psi.

Beckman / process instruments
BECKMAN INSTRUMENTS, INC. FULLERTON, CALIF.

☐ Please send me a pH System Analysis Form that will entitle me to a free engineering analysis and recommendation for solving pH problems at our plant.

☐ Please send me a copy of "Industrial pH Measurement and Control" and add my name to your mailing list to receive additional information on pH control.

Name: _____ Title: _____

Firm: _____

Street: _____

City: _____ Zone _____ State _____

440-11

When inquiring check 6583 opposite last page

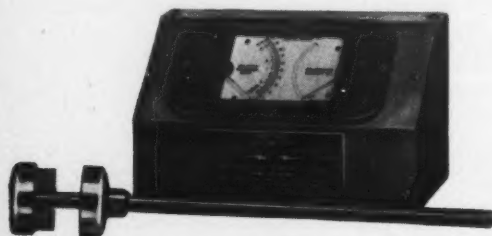
Measures minute air flows for smog studies . . .

Covers range to 30 mph and allows expanded readings in low velocity range below 5 mph

Uses: Measuring minute air flow movements in smog, air pollution, other applications where small air flow measurements are required.

Features: Air flow meter provides expanded readings in low velocity range with response time of less than one second.

Description: Air velocity meter uses a measuring probe based on metal thermopile principle.



Measures air flow movements with response time of less than one second

Probe is horizontally nondirectional and can be used for either portable or fixed installation. Instrument has range of 0 to 30 mph.

Indicator unit is $4\frac{1}{2} \times 4\frac{1}{4} \times 7\frac{1}{2}$ " and operates on 90-135 volts AC. Battery-operating units can be supplied for field use.

(Model R Air-Meter is product of Hastings Instrument Co., Dept. CP, Hampton, Va. . . . or for more information check 6584 on form which is located opposite last page.)

Replaces electrical relays without using contacts or moving parts . . .

static switching system uses magnetic amplifiers for built-in reliability and long operating life

Developed as a control system to replace electrical relays, static switching system acts as control device without any moving parts. System will be particularly useful in hazardous or difficult-to-reach locations where long term reliability is desirable.

Components of static switching system are modular plug-in cartridges encapsulated in polyester resin to withstand mechanical shock and adverse environments. Construction and design principle are estimated to have resulted in system elements capable of operating fifteen times longer than conventional equipment.

AUTOMATIC CONTROL OF V

A REEVES engineering report on a new control that completely automates mechanical variable speed . . . accurately controls and integrates processing variables

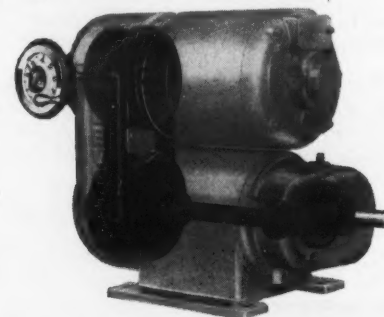
New Control Demands

Recently, with the intensified interest in automating production and processing lines, there developed many new measuring instruments whose signals had to be translated into automatic control of variable speed drives. These signals reflected changes in many variables—such as pressure, flow, weight, level, color, light intensity, radio-activity and peripheral speed.

The instrumentation industry has been ingenious in developing devices to sense and measure these variables, translating them into the industry standard of 3 to 15 psi air pressure; each equal increment of change in psi representing a linear change in the measured signal.

The need, then, has been for some type of automatic control to accurately and continuously transfer the instrument air signal to equally proportioned changes in the output speed of the variable speed drive.

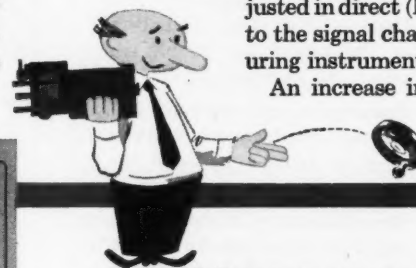
The most logical choice for the basic mechanical variable speed drive is the versatile and efficient REEVES Motodrive . . . an inexpensive power package that combines the motor, variable speed mechanism and gear head reducer into one compact unit. The Motodrive operates on the time-tested principle of a V-belt driving between two pairs of cone-shaped discs which are adjustable to form an infinite number of driving and driven pitch diameters to give variable speed at the output shaft.



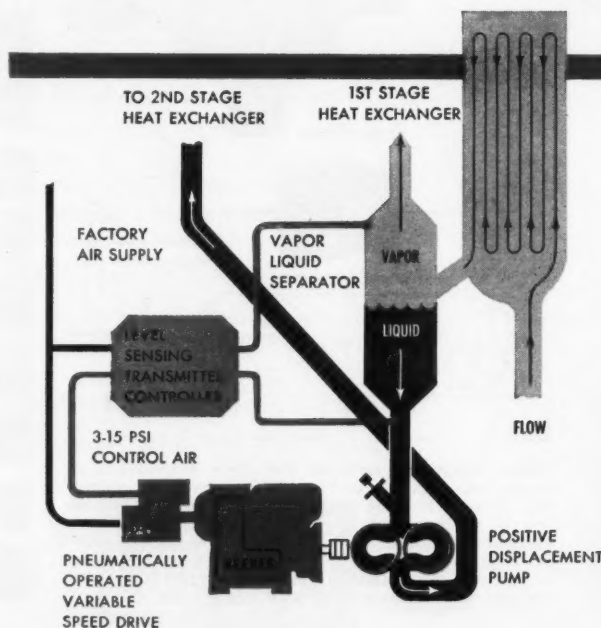
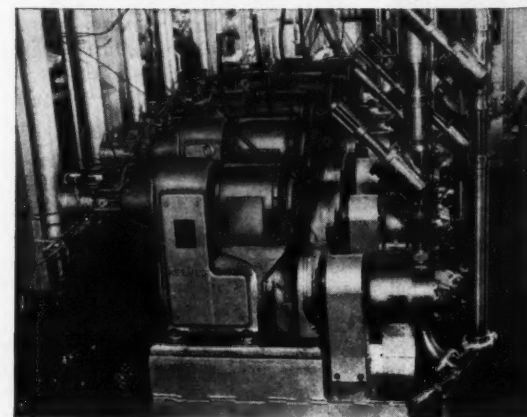
Reeves Automatic Control

By replacing the manual "handwheel control" of the Motodrive with a pneumatic REEVES Automatic Control, output speeds are continually adjusted in direct (linear) proportion to the signal changes of the measuring instruments.

An increase in the instrument



How one plant



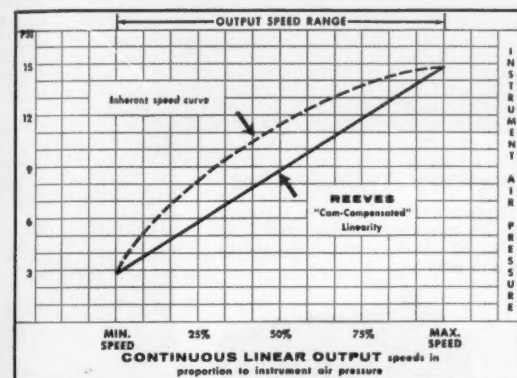
OF VARIABLE SPEED DRIVES

INSTRUMENTATION & CONTROL

control pressure activates a valve, admitting supply air to a cylinder chamber. This force against the air piston in the cylinder moves the speed shifting mechanism of the REEVES Motodrive to increase the output speed.

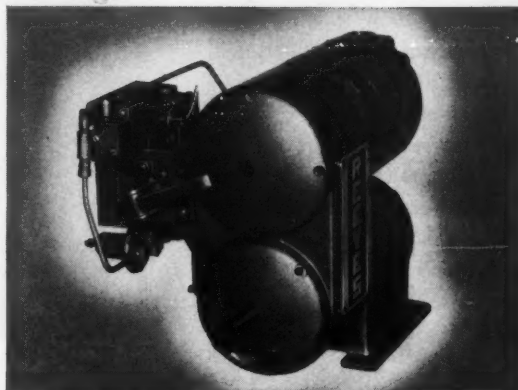
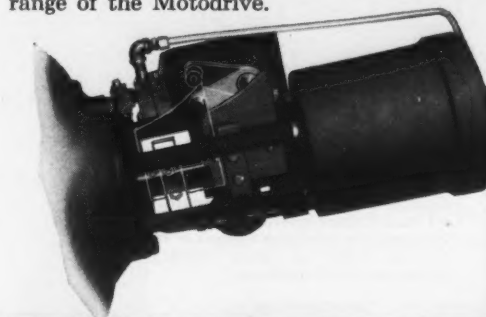
A decrease in control pressure exhausts air from the cylinder chamber, causing a decrease of the output speed. Any change, therefore, in control pressure of the measuring instrument gives an automatic corresponding change in the output speed of the REEVES Motodrive . . . resulting in exact processing control.

Cam-Compensated Design



The output speed of this type of variable speed drive with standard controls is in the form of a curve.

The REEVES Automatic Motodrive incorporates a cam to control output speeds in direct (straight line) proportion to instrument air signal variations. This cam is contoured to produce linear speed changes over the entire output speed range of the Motodrive.



Switching component is encapsulated in resin block

Control system uses DC amplifiers where the output is controlled by an input signal — which is the same operation as that of a relay. Two windings on a core of grain-oriented magnetic steel are the basis of system. Core provides a sharp hysteresis which, in conjunction with core saturation, controls output current. By proper rectifier circuitry, current in one winding always drives core towards positive saturation. Another current is made to flow in the opposite winding in such a direction as to drive core toward complete saturation in the opposite direction. By arranging the phasing so that two currents are 180 degrees out of phase, the core will oscillate between positive and negative saturation. Introduction of a signal voltage causes core saturation and then appears across the element load after a response time of one-half cycle. Addition of the signal voltage to the negative oscillation voltage amplifies the input signal.

Modular plug-in cartridges are approximately 3 x 2 x 2". Elements fit into a specially designed power channel where studs are used to lock modules into a compact, nearly solid assembly. When more than 15 modules are required for a system, additional channels can be mounted side-by-side or end-to-end.

(If Cypak modules are product of Westinghouse Electric Corporation, Dept. CP, 401 Liberty Ave., Box 2278, Pittsburgh 30, Pa. . . or for more information check 6586 on form opposite last page.)

VTVM's, VOM's and AC/DC meters

Printed in two colors, four-page bulletin shows electrical meters. Millivolt meters, vacuum tube voltmeters, watt meters, volt-ohmmeters, and other electrical instruments are included.

Bul 3001 is issued by Simpson Electric Company, Dept. CP, 5200 W. Kinzie St., Chicago 44, Ill. When inquiring specify 6587 on form opposite last page.

utilizes this Reeves Control

Evaporating the natural waters from fruits to produce fruit concentrates has greatly reduced the cost of packing and shipping of fruits.

Great care must be exercised in the exposure of the fruit pulp to temperature and pressure to retain the natural flavor.

A recently designed and remarkably fast one-pass process incorporates REEVES Automatic Motodrives to automatically control the critical relation between concentrate density and rate of flow.

As water is evaporated from the fruit pulp, the smaller volume reflected by the dropping level in the liquid-vapor separator is sensed by a pressure differential transmitter.

Converted to 3-15 psi air, this signal works through the automatic controller to reduce the speed of the REEVES Motodrive and, in turn, the speed of the constant displacement discharge pump.

The REEVES Automatic Motodrive, used in connection with modern instrumentation, is your answer to flexible, sensitive, accurate speed control for automatic processes.

We don't know *all* the possible applications for this control . . . but our engineers will be glad to work with you on *your* processing problems. For more details, write for Bulletin CP25-M542.

REEVES DIVISION • COLUMBUS, INDIANA
RELIANCE ELECTRIC AND ENGINEERING CO.

When inquiring check 6585 opposite last page

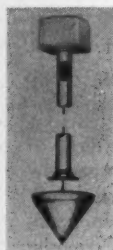
**Controls chlorine feed
proportional to
water flow . . .**

immersed float vacuum transmitter governs chlorinator

Uses: Controlling amount of chlorine introduced into water flow by chlorinator.

Features: Immersed float vacuum transmitter is unaffected by chlorine sewage gases, weather. Virtually no maintenance is required.

Description: Transmitter is a force balance unit, with no moving parts, which gives a vacuum signal proportional to mainline water flow. Signal governs amount of chlorine introduced into the system. Equipment is suitable for use in Parshall flumes, Kennison nozzles, and weirs.



Increase in main-line water flow causes water level in stillwell to rise. Buoyancy of float is thus increased. As float decreases in weight, a greater vacuum is transmitted to chlorinator, causing more chlorine to be introduced into the system. If water flow decreases and level in stillwell drops, vacuum is throttled to reduce chlorine flow rate.

Float is cone shaped and hangs by chain from clevis attached to vacuum transmitter. Chain length is adjustable so that float tip just touches water at zero level. Chain, turnbuckle, and metal parts are stainless steel. Diaphragms are Kel-F plastic. Transmitter body and diaphragm backing plates are Uscolite. Float and transmitter cover are polymer-impregnated fiber glass. Float sizes are 5 to 30 inches in five-inch increments.

(Vacuum transmitter is product of Fischer & Porter Company, Department CP, 555 Jacksonville Road, Hatboro, Pennsylvania . . . or for more information reader may simply check 6588 on form which is located opposite last page.)

GET THE BEST SOLUTION TO EVERY FLOW

Differential Pressure Cell Transmitters

Complete line includes air-operated and electric-operated d/p Cell Transmitters covering ranges from 0-25" to 0-800" of water; working pressures up to 1500 psi.

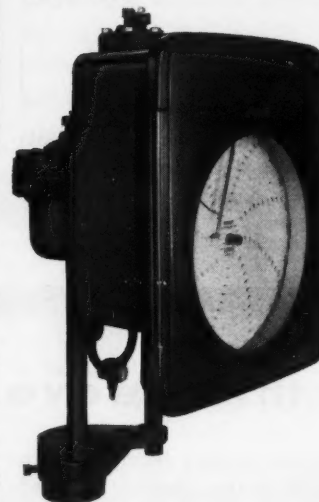


Type 13A d/p Cell Transmitter

- Positive Overage Protection—up to full 1500 lb. rating
- Fully Adjustable Ranges—0-20" to 0-80" and 0-50" to 0-250" water
- Automatic Internal Damping—fast, stable measurement
- Simplicity—easiest, lowest-cost installation, lowest maintenance

Mercury Type Meters

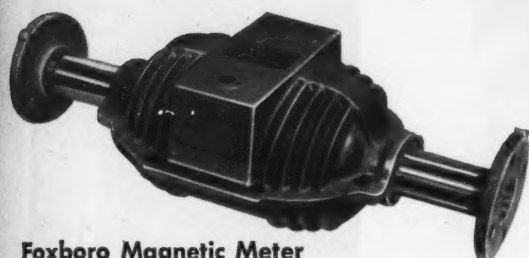
Complete line includes mercury types covering ranges from 5 to 400" of water; working pressures up to 5000 psi.



Type 28 Mercury Meter

- Permanent Full-Scale Meter Accuracy—exclusive segmental lever design provides linear transmission
- Highest-Powered Pen Drive—large float with long travel
- Minimum Ambient Temperature Effects—float located in high pressure chamber

PROBLEM

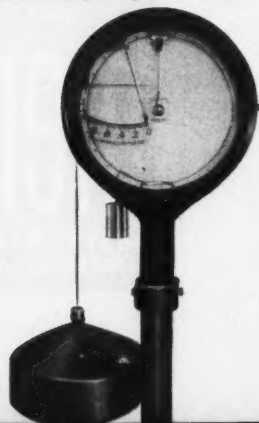


Foxboro Magnetic Meter

- Measures Fluid Velocity Directly
- Adds No Pressure Drop
- Uniform Flow Scale
- Overall Accuracy Better than 1% of Range Over Entire Scale
- Full Accuracy Sustained Even on Liquids Other Meters Can't Handle — even sand and water slurries

Float-and-Cable Type Meters

- Rigid Construction — weather-tight case; all working parts of corrosion-resistant materials
- Powerful Accurate Operation — large, high-stability float; cable of spun glass and nylon—non-stretching, non-twisting
- Direct Reading Chart and Scale
- Direct Reading Integral Counter



THERE ARE two logical reasons why Foxboro Instrumentation assures you optimum results in measurement or control of process fluid streams. First; Foxboro offers the widest variety of measuring and controlling devices . . . the right equipment for every application. For example, only Foxboro offers all these basic meter types: differential pressure cell flow transmitters, magnetic meters, mercury meters, and weir meters. Second; Foxboro provides 45 years of engineering experience in every phase of fluid mechanics. From the simplest general utility-type instrument to complex automatic ratio control systems, you get highest accuracy, efficiency, and economy. Whenever you have a flow problem involving liquids, vapors, gases, or slurries — in pipes, ducts, or channels, you can solve it best by specifying Foxboro. Only a few instruments are described on these pages. For full details; or for specific information on your problem, contact your nearby Foxboro Field Engineer, or write The Foxboro Company, 817 Neponset Ave., Foxboro, Mass.

FOXBORO

REG. U. S. PAT. OFF.

FIRST IN FLOW

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

Other Foxboro Flow Instrumentation

Electric or Pneumatic Type Rotameters
Electric, Pneumatic, and Mechanical Integrators

Planimeters

All Primary Elements, Valves, and Accessories required for assembly of complete flow measurement and control systems

INSTRUMENTATION

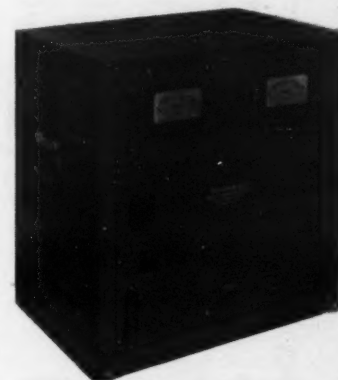
Supplies DC power over two ranges as needed . . .

power unit gives regulated DC without using tubes

Uses: Supplying regulated DC voltage for magnetic amplifiers.

Features: Power supply unit has two voltage outputs — 5 to 30 volts and 10 to 40 volts — both at 30 amperes.

Description: Dual voltage power supply contains no moving parts and is tubeless. Voltage regulation is $\pm 1\%$ over both voltage ranges. Response time is within 0.2 seconds. DC output has ripple component of 1%



Meters show DC potential and current

rms. Unit requires AC input of 100 to 130 volts, single-phase, 60 cycle. Weight of power supply is approximately 200 pounds. Dimensions are 22 x 15 x 23" in cabinet form, or 19 x 15 x 21" in standard rack panel mounting.

(Power Supply Model MR1040-30A is product of Perkin Engineering Corp., Dept. CP, 345 Kansas St., El Segundo, Calif. . . . or for more information check 6589 on the convenient Reader Service slip which is located opposite last page.)

For more information on product at left, specify CP 6590 . . . see information request blank opposite last page.

Self-scouring!
SIMPLEX PARABOLIC FLUME
 Measures open flows within $\pm 2\%$
 ...over full 20 to 1 range!
PLANT WASTES • ALKALIES
ACIDS • WATER • SLUDGE



Type S Flume is used alone to indicate flow ... with meter to record, totalize.

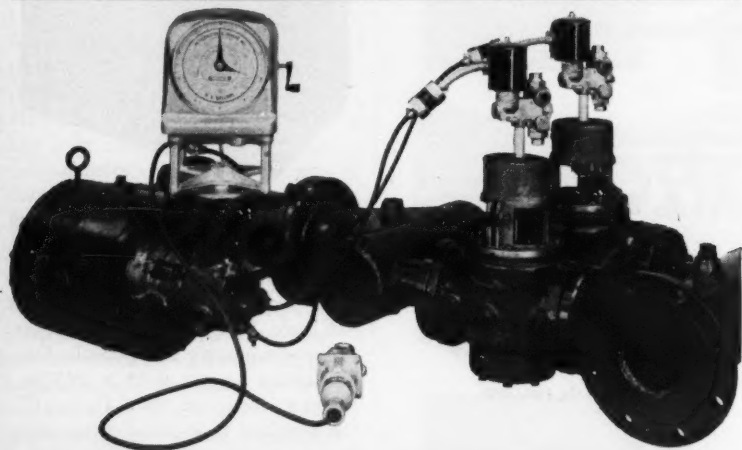
Easy to Install! No special approach piping needed. Inlets fit 6" to 36" pipe. Leveling pins simplify field setting.

Smooth transition from circular inlet to parabolic outlet speeds flow, keeping flume clear. Big chamber traps sediment, keeps piezometer hole clean.

WRITE FOR BULLETIN 800
 Simplex Valve & Meter Company
 Dept. CP-7
 7 East Orange St., Lancaster, Pa.

Accurate instruments and controls since 1904

SIMPLEX
VALVE AND METER COMPANY
 When inquiring check 6591 opposite last page



TYPICAL DUAL-VALVE FLUIDOMETER SYSTEM

Dual valve Fluidometer Systems insure maximum accuracy in handling large flow rates. The dual valve system also reduces line shock, thereby keeping maintenance to a minimum. In this type of installation the Fluidometer System is so arranged that the liquid flows through both valves. The large valve shuts off before delivery is complete, reducing the flow rate. The control head controls both valves—staggering the closure to insure greater accuracy. New Bulletin FI-56 will be sent on request.

For information on jacketed pipe and fittings write for Bulletin J-56.

for greater accuracy
 in handling large flow
 rates in either jacketed
 or unjacketed systems

HETHERINGTON & BERNER INC. • 711 Kentucky Ave., Indianapolis 7, Ind.

When inquiring check 6592 opposite last page

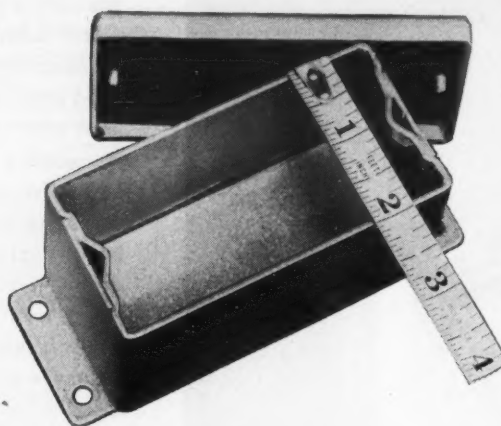
INSTRUMENTATION & CONTROL

**Has neoprene protective gasket
 for oil-tight seal . . .**

designed to be used with flexible liquid-tight wiring conduit

Uses: As wiring box with flexible, liquid-tight electrical wiring conduit.

Features: Electrical wiring box has neoprene protective gasket for oil-tight seal.

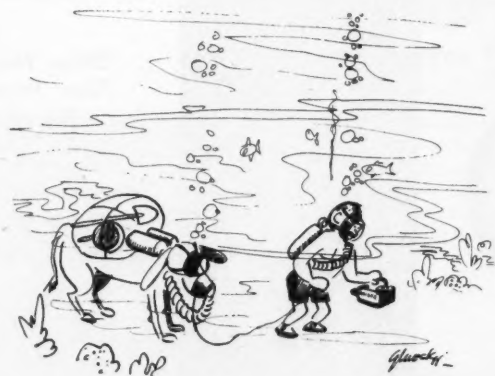


Tape indicates size of wiring box

Description: Electrical wiring box is 4 x 2 x 2 inches. Captive cover screws thread into blind holes. Seams are welded and material is 14-gage steel. Finish is a baked enamel gray hammertone on a phosphatized surface.

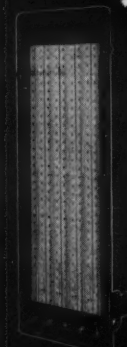
(Model 402 wiring box is product of Hoffman Engineering Corp., Dept. CP, 1329 Tyler St., Anoka, Minn. Check 6593 opposite last page.)

(Please turn to page 131)



UNMATCHED ACCURACY

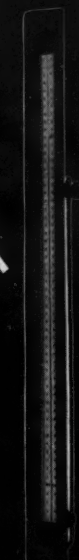
**...in over 1000
 different
 manometer
 forms**



for
 pressures



for
 flows



for
 vacuums

Add to the uncompromising accuracy of Meriam Manometers the availability of a specific form most suited to the application. The result is simple, practical and permanently accurate instrumentation . . . at lowest cost . . . for every process and laboratory need.

Send for Bulletin C-12

Meriam Manometer Instrumentation

*...for pressures, vacuums,
 flows, liquid levels.*

meriam

INSTRUMENT COMPANY

10920 Madison Ave. • Cleveland 7, Ohio

When inquiring check 6594
 opposite last page

CHEMICAL PROCESSING

(Continued from page 20)

same level, with firm and conditional commitments to the government for one and a quarter million pounds. Use of the old Kroll process, however, will keep the AEC's billing "above \$8." National Research, also with a one and a half million pound annual production, will send 700,000 pounds to the government at "something like \$6.50," leaving the balance to "civilians."

Where's it all going? Nobody really knows yet but the possibilities are legion. A tremendous market should exist in the chemical industries, for corrosion control. Zirconium is practically unharmed by caustic soda or hydrochloric acid, as well as a number of other heretofore hard-to-contain corrosives. And common impurity hafnium need not be removed for corrosion performance — as it is for AEC work.

The material may also find use as a stabilizer in steel manufacture. This application is pretty widely known but used very little. New, low prices should increase its use here a great deal.

Other uses: The metal makes an excellent "getter" for electronic tube evacuation. In high proportions, zirconium increases greatly the structural strength of magnesium, valuable in aircraft production. In low proportions, the zirconium refines the magnesium's grain size and improves the workability. Zirconium boride can withstand temperatures up to 6000°F, so it is a good candidate for use in rocket combustion chambers.

Pegged to the nervous car picture

... American Viscose sales, after six consecutive good quarters, seem destined for a slump in the second fiscal period of 1956. Selling about 25 percent of its rayon production to Detroit — principally for auto upholstery and tires — Viscose quickly reflects any trouble in the auto capital.

Other reasons for the slump ... imports of rayon from abroad are beginning to hurt. And, too, some customers are holding off in the belief that further price cuts are in the offing. Viscose officials dispute this ... "Prices are too low now, and hopes of new cuts are unfounded."

But with net sales and earnings for the first quarter up over the same period of 1955, (sales were \$68.5 million for the period this year as opposed to \$66.4 last year) and forecasts of an improved third and fourth quarter, Viscose officials are still expecting a substantial year. The textile industry's seasonal slump should be ending about now and Detroit predicts that passenger car sales will run between 5.8 and 7.8 million annually for the next three years.

Still, everybody's not happy ... recently surveyed auto dealers **and people in the textile industries** generally do not expect to share in the immediate prosperity.

Epoxy frontier extended

Though price and quantity information is still sketchy, Carbide and Carbon is going ahead with plans to produce "pure" peracetic acid commercially. Probably it will not be available in quantity for a year or more. When it is there will be some changes in the present epoxy picture.

Epoxidation (adding an extra oxygen to the molecule) is a tricky process for some materials. In some cases even the mildest conditions suitable for epoxidation tear up starting molecules ... in others, such violent measures have been needed that even sturdy molecules are broken up. Peracetic acid can get around both of these hazards. (See page 28 for details.)

The catch has been that peracetic available to date contained water — which

leads to fast side reactions. Carbide's process will use air oxidation of acetaldehyde ... and turn out an ultimate product containing peracetic in an inert solvent.

It is this purity that makes the acid a key to new chemical territory.

There are other bonuses, though. Cost is figured to be a point in favor of the new acid. (This is being explored — Chemical Business will report on it in an early issue.) Pure acetic acid is recoverable from the process as a by-product.

Reduced stream pollution

... will result from the Brown Company's \$3.5-million furnace and evaporating equipment installation ... but "it will not be a cure-all for present pollution conditions in the Androscoggin River" since pollution from below the Brown Company's plants won't be affected. Project involves conversion of the sulfite pulp operations to a magnesium-base acid process. The mills are located in Berlin and Gorham, New Hampshire.

Liquid adhesives and resins

... from Stein, Hall & Company's new plant, office and laboratory will be on the market by the end of the year. Addition at Charlotte, North Carolina, will cost \$250,000.

2, 6-Diaminopyridine

... production facilities are expanded by Reilly Tar & Chemical Corp., Indianapolis. It's used as a pharmaceutical intermediate and curing agent for epoxy resins.

Newest entrant

... into the vinyl chloride monomer field is the Ethyl Corporation. Plant is to be located at Ethyl's manufacturing center at Baton Rouge, La., with completion expected by near-end of 1957.

(Continued on page 130)

Spotlight on People

(Continued from page 129)

Plant cost will be several million dollars. Initial output will not appear on the market as it will be sold under long-term contracts.

\$64,000 questions

... occur every day in chemical market research. Because market research techniques are not formalized (even experts hesitate to call it a science) there has been no way to learn about it except by doing. This picture is changing ... common problems and experiences have led to a growing body of available information.

Most recent among the "how to do it" books on chemical market research is "Chemical Market Research in Practice." Sponsored by Chemical Market Research Association, the book has 22 authors and is derived from the first lectures on the subject given at the college level.

If you have no other book on the subject, here is a good one to start with. It is not a textbook ... you'll find very little theory. Less than 30 pages are devoted to defining and "backgrounding." The balance of this 196-page guide is a "cookbook." But a cookbook written by men who have faced the problems and solved them.

Sample recipes: how to make a survey, how to use literature, effective field work, presenting results. Specific industries include plastics, fibers, detergents, petrochemicals, sulfur, coatings. To obtain a copy remit \$3 direct to Reinhold Publishing Corp. Dept. CP, 430 Park Ave., New York 22, N. Y. ... or check 6595 opposite last page.

More plastic tanks

... will result from Haveg Industries' expansion and acquisition of Pla-Tank Corporation. Diversification will include full line of polyester glass tanks, fume ducts, hoods, stacks, **plus** all plastic outboard runabouts.

Dr. Max E. Bretschger has retired as division president of Food Machinery's Becco Chemical division and will become senior technical advisor on peroxygen chemicals. And in FMC's chemical divisions ... **Arthur S. Weygandt** is new central development department manager while **William D. Morrison** is named to new post of manager, foreign chemical development.

Rayonier v-p **Russell F. Erickson** is elected to the company's board of directors.

National Starch appoints **Robert A. Bintz** and **Lester Klempner** to assistant v-p posts.

Monsanto forms a new division — domestic subsidiaries and affiliates — and names vice-president **J. Russell Wilson** manager. And appointed new v-p — **Howard K. Nason**. Also at Monsanto ... **Dr. James H. Lum** is promoted to manager of research and development for the organic chemicals division, **Dr. Ferdinand B. Zienty** is new director of research and **Monte C. Throdahl** is director of development for the R and D division. **Charles L. Lightfoot Jr.** will become manager of new product development in the research and engineering division's development department.

A. William Rhodes is appointed manager of Dow Corning's consumer products department.

New staff appointments in Diamond Alkali's chlorinated products division ... **Dr. M. J. Skeeters** becomes manager of research, **Alex Hlynsky** is new divisional group leader for research.

Michael Sandor joins Nopco Chemical as development engineer in the metals processing chemicals department.

DuPont promotes two in the textile fibers department ... **Edgar H. Bleckwell** is new director of nylon manufacturing division and **Emil O. Johnson** is production manager for nylon. And in the company's petroleum chemicals division ... **Robert F. Harwick** is named manager of the Western region, **Edison D. Jeffus** is additives manager for the Gulf Coast region, and **William W. Wingate** is additives manager for the Mid-Continent.

Louis M. Sherman, a member of CHEMICAL PROCESSING's Editorial Advisory Board, is named manager of market development for Thiokol Chemical Corporation.

D. J. O'Connor Jr. is retained as president of American Cyanamid's newly acquired subsidiary, Formica Corporation.

William Foster is named executive v-p in charge of industrial chemicals at Olin Mathieson.

News from PennSalt ... **Dr. George McCoy** is moved to manager of the company's research and development department, **Thomas E. Deger** is new director of organic research, and **Dr. Paul A. Munter** is named director of analytical research in the research and development organization.

And at Dow ... **J. W. Britton** is assigned full-time responsibility as manager of agricultural chemicals. And **Dr. A. P. Boutel** is given responsibility of constructing and developing the firm's new Louisiana division with **J. R. Stein** appointed project manager.

**Builds remote control systems
using twenty-one standard
"building blocks" . . .**

five complete control systems can be developed
by connecting electronic modular components

Uses: As units for one of five different control systems including automatic alarm, remote metering, discreet control, proportional control, transmission systems.

Features: Building block control units are interchangeable and require only plug-in installation.



Modular unit is held in hand. Complete control system is at left

External circuits can be low voltage signal circuits, eliminating conduit. Maintenance can be by replacement of complete unit which then can be returned to factory for complete overhaul.

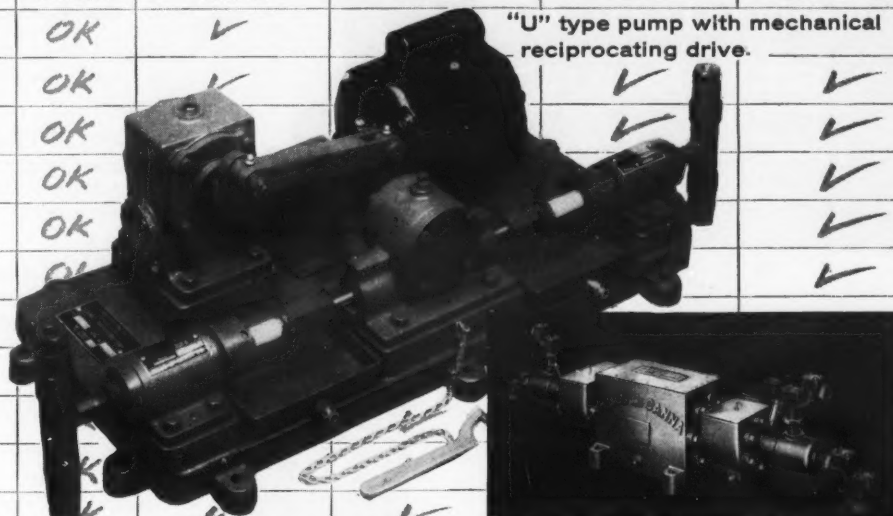
Description: Control system uses either DC or tone transmission. Either method can be used, independently or in combination with each other, over one control circuit. By proper selection of modular units, control systems can be built to measure and transmit operational information on pressure, vacuum, speed, rate of flow, temperature, load, position, count. Systems can be devised to report bin and tank levels. Control components of system are sufficiently flexible to start and stop a process, apply proportionate amounts of control, regulate sequence, or supply selective control.

System operates on 115v AC and maintains accuracy with moderate line voltage variation. Transmission can be over leased lines. Private circuits need only one or two lines and ground return.

(Supervisory Control Systems are product of Sparks Control Systems Division, The Sparks-Withington Company, Dept. CP, Jackson, Miss. Check 6596 on form opposite last page.)

Why the FIRST COST is the LAST COST with HILLS-McCANNA METERING PUMPS

| PUMP MAINTENANCE REPORT | | | | | |
|-------------------------|-------|-------|--------|--|-------------|
| MONTH | CHECK | VALVE | STROKE | PLUNGER | LUBRICATION |
| JANUARY | OK | ✓ | | "U" type pump with mechanical reciprocating drive. | |
| FEBRUARY | OK | ✓ | | | |
| MARCH | OK | | | ✓ | ✓ |
| APRIL | OK | | | ✓ | ✓ |
| MAY | OK | | | | ✓ |
| JUNE | OK | | | | ✓ |
| JULY | | | | | |
| AUGUST | | | | | |
| SEPTEMBER | | | | | |
| OCTOBER | OK | | | | |
| NOVEMBER | OK | ✓ | ✓ | | |
| DECEMBER | OK | ✓ | ✓ | | |



HILLS-McCANNA dependability pays off in lower maintenance . . . longer life . . . greater accuracy . . . cost-saving versatility

Maintenance reports from the leaders in many different industries prove the low-cost operation of Hills-McCanna metering and proportioning pumps . . . tell why these pumps are specified for installations requiring the finest equipment. Part replacement is remarkably low because there are few points of wear. Routine maintenance is simple and economical thanks to special Hills-McCanna features, such as separate interchangeable check valves and easy, precise stroke adjustment (even while in operation when desired). Working parts are completely enclosed to keep them dirt-free. All U Type pump bodies are interchangeable in the housing for quick convertibility. Straight reciprocal drive eliminates bushing replacement. And,

you'll find Hills-McCanna pumps mighty easy to install.

If you must continuously meter or proportion small volume flows with great accuracy, you'll want to consider the "U" type pump—available in 1, 2, 3 and 4 feed units. The "K" type pump—also available in 1, 2, 3 or 4 feed units—will meet your larger flow requirements.

Hills-McCanna can furnish a pump to meet every type of installation . . . with a wide choice of corrosion, wear and abrasion-resistant liquid ends . . . in capacities and pressures for every need.

Write for full facts now. You'll be dollars ahead tomorrow by investigating today!

A dependable NEW HEART to put NEW LIFE into your chemical metering system!

HILLS-McCANNA COMPANY

3025 N. Western Avenue, Chicago 18, Illinois

metering and proportioning pumps
also manufacturers of: **FORCE FEED LUBRICATORS • DIAPHRAGM VALVES
MAGNESIUM ALLOY SAND CASTINGS**

When inquiring check 6597 opposite last page

DEKORON PRODUCTS CUT INSTRUMENT TUBING COSTS

EASY-TO-INSTALL INSTRUMENT LINE HARNESS

DEKORON Poly-Cor is a new concept in instrument tubing—a lightweight instrument line harness that can be strung as easily as electric wiring.

Poly-Cor is composed of color-coded polyethylene tubes over which is extruded a thick vinyl sheath. This construction means instrument lines are completely corrosion proof. Their natural resiliency resists physical damage. Harness composed of 4, 7, 10, 14 or 19 (illustrated) individual lines is available.

Initial cost... installation... corrosion resistance... maintenance—no tubing can compare with patented Dekoron Poly-Cor. Request Bulletin L-6506.

Use Dekoron E-Z Tube Fittings. Specifically designed for use with Poly-Cor or with single-line plastic Dekoron "P" Tubing.

Dekoron products

quality
research
service

SAMUEL MOORE & COMPANY • MANTUA, OHIO

DEKORON PRODUCTS DIVISION

When inquiring check 6598 opposite last page

INSTRUMENTATION

**Has plastic casing
to protect meter
from shock . . .**

outer tube does not contact fluid at any point

Uses: Measuring flow in laboratory applications.

Features: Flowmeter has outer tube of plastic to protect the glass flowmeter tube.

Description: Outer tube is of Tenite II plastic and is at no point in actual contact with measured fluid. Pipe-end fittings are of corrosion-resistant stainless steel, with gaskets of Hycar rubber, to allow direct connection to piping. Stainless steel hose ends, for connection to rubber tubing, are also available.

(Guarded Flowmeters are product of Emil Greiner Co., Dept. CP, 20-26 N. Moore St., New York 13, N. Y. Check 6599 opposite last page.)

Sets forth standards for thermometers

Series of five standards deals with bimetallic, resistance, filled system, glass stem industrial and thermocouple thermometers. Each is several pages long and illustrated. These standards are designed to clear up misunderstandings between purchasers and suppliers of temperature measuring equipment. Definitions and accepted specifications are included.

SAMA Standards RC4-10 (Bimetallic), RC5-10 (Resistance), RC6-10 (Filled System), RC7-10 (Glass Stem Industrial), and RC8-10 (Thermocouple) Thermometer Standards are issued by Scientific Apparatus Makers Assn., Dept. CP, 522 Fifth Ave., New York 36, N. Y. When inquiring specify 6600 on form opposite last page.

a big line of SMALL packless valves



Packless valves are designed for tough applications, like critical high vacuums, corrosive or dangerous fluids and high temperatures. Our experience with these problems has helped us to design a packless valve line broad enough to suit many of these applications. As evidence may we present:

The 431 Series — a greatly improved version of the Hoke brass bellows needle valve offering extended, leak-tight service life . . . suitable for sampling systems and analysis equipment—bronze bellows, stainless steel (blunt or vee) spindle in $\frac{1}{8}$ " and $\frac{1}{4}$ " pipe sizes.

The 480 Series — Globe or angle valves in brass or monel with phosphor bronze or monel bellows.

The 440 Series — for supercritical applications. An all stainless bellows valve with Teflon seat— $\frac{1}{8}$ " to $\frac{1}{2}$ " pipe sizes. (Both 480 and 440 series have replaceable bellows assemblies.)

The 411 Series — All metal monel diaphragm valves with low internal volume and excellent service life.

For those of you who have special problems, modifications of these valves are available for high temperatures and pressures. You'll find us most receptive to your inquiries.

WE'VE JUST COMPLETED A NEW PACKLESS VALVE BULLETIN THAT WE'D LIKE TO SEND TO YOU. WRITE TO

HOKE **HOKE INCORPORATED**
Fluid Control Specialists
145 S. DEAN STREET, ENGLEWOOD, NEW JERSEY

When inquiring check 6601 opposite last page

CHEMICAL PROCESSING

Measures refractive index and compares process against standard

Sealed optical system, photocell detection, null balance system for maximum accuracy

Uses: Monitoring and controlling liquid streams for which refractive index furnishes a standard of purity. Applications include petroleum refinery operations, hydrogenation of fats and oils, concentration of solutions, separation of aromatics, polymerization, monitoring chromatographic columns.

Features: Differential refractometer has rapid response, with full scale deflection in 15 seconds. Over a 24 hr period stability is $\pm 1/2$ per cent full scale.

Description: Differential refractometers are available in three models, varying in sensitivity and designed for different applications. Sensitivities are 0.0001, 0.00001, and 0.000002 in refractive index. All component parts of instrument are mounted on a single panel. Modular construction allows combinations of sensitivity, sampling, recording, temperature compensation as required.

Refractometer continuously monitors process streams

Instrument operates by measuring change in refractive index. Any change in process stream sample index causes an unbalance signal in detector circuit. Signal is amplified and transmitted to servo-system. Signal polarity is determined and used to drive the restoring plate so as to bring system to balance. Shaft of the corrector plate is mechanically coupled to a potentiometer, part of a telemetering system, for remote indication. Instrument uses a sealed optical system, photocell detection, and a null balancing system for maximum accuracy.

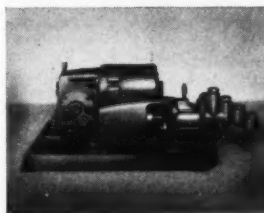
(Barnes Differential Refractometer is product of Barnes Engineering Company, Dept. CP, 30 Commerce Road, Stamford, Connecticut . . . or for more information reader may simply check 6602 on the convenient Reader Service slip which is located opposite last page.)

In this Controlled Volume Pump, a pneumatic piston operator receives an instrument air signal and actuates a variable speed transmission. Pump speed is automatically adjusted to process demand. Servo systems for automatic adjustment of stroke length by instrument air signal also available.

This pump is a 4-cylinder formulating unit. All liquid ends are powered by a variable speed drive, manually adjustable. Stroke length of each liquid end is individually adjustable, manually.



Standard motor-driven, simplex - controlled volume pump, with constant speed motor and manual adjustment of stroke length.



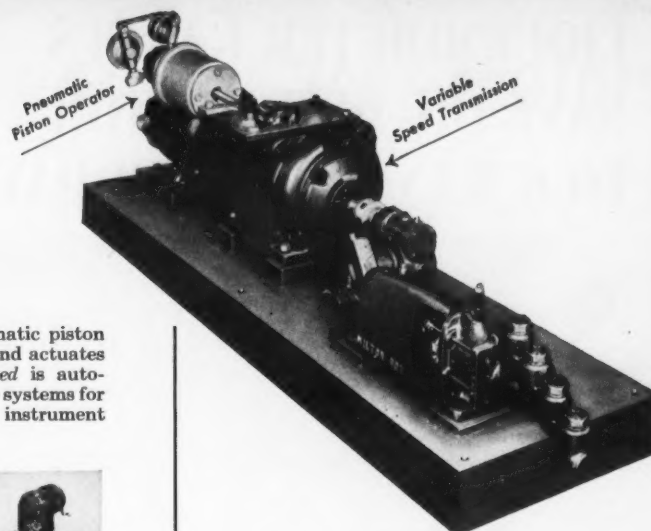
This formulating pump has two "miniPumps" (capacities in milliliters per hour) and one standard motor-driven pump, all powered by one constant speed drive. Stroke length of each unit is manually adjustable while pump is in operation.



Which pump is best for YOU?

Write today for application data on Controlled Volume Pumps in:

Paper Making (Bulletin 455)
Industrial Water Treating (Bulletin 953)
Process Instrumentation (Bulletin 1253)



Broad flexibility for metering process additives

If you pump and meter chemicals against a head . . . or maintain fixed ratios of two or more chemical streams . . . or automatically regulate flow of a control agent in a control system, such as pH, there's a Milton Roy Controlled Volume Pump that's exactly right for your application.

Illustrated are a few of many flexible adaptations in simplex, duplex and formulating pump designs that are available from Milton Roy, with manual or automatic adjustments of stroking length or speed. Capacities range from 3 milliliters per hour to 45 gpm, pressures up to 50,000 psi. Accuracy of delivery is within plus or minus one percent. Liquid ends are furnished in a wide selection of alloys and in plastic. Sanitary design, too.

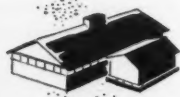
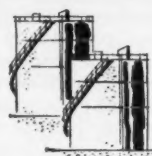
Have you investigated how you can reduce chemical costs and upgrade product quality by using controlled volume pumps? One of the bulletins listed probably contains the economical answer to your chemical metering problem. Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Philadelphia 18, Pa.



Engineering Representatives in the
United States, Canada, Mexico,
Europe, Asia, South America and Africa.

When inquiring check 6603 opposite last page

LIQUIDOMETER GAUGES SAVE OIL DISTRIBUTOR 4 TO 6 MANHOURS PER DAY



Liquidometer gauges have entirely eliminated costly, hazardous and time consuming dip stick measurements at the bulk fuel plant of the Staten Island Oil Company, Staten Island, New York. By providing accurate, easy to read indication of fuel levels continuously, Liquidometer gauges expedite inventory control... and actually save Staten Island Oil an estimated 4 to 6 hours per day.

At Staten Island Oil, as in countless other industrial installations over the last 35 years, Liquidometer gauges contribute major operational efficiencies... lasting, trouble free, accurate measurement of storage tank contents.

Underwriters Approved for gauging hazardous liquids, Liquidometers are available in a wide variety of hydrostatic and float types, direct and remote reading models.

For complete details, write Dept. H for Bulletin 463.



Liquids worth storing are worth measuring

THE LIQUIDOMETER CORP.

SKILLMAN AVENUE AT 36TH STREET, LONG ISLAND CITY 1, N.Y.

INSTRUMENTATION & CONTROL

Examines inside walls of tubes, cylinders, other hollow bodies without dismantling...

detachable viewing heads allow forward, lateral, oblique, and wide angle views



Allows inspection of tubing up to 72 feet in length

Uses: Optically examining inside walls of tubes, cylinders, boilers, boiler tubes, other hollow bodies of various shapes, without cost of dismantling.

Features: Optical viewer has variety of detachable objective viewing heads which allow forward, lateral, oblique, and wide angle views.

Description: Optical viewers are relatively large industrial instruments ranging from one half to one and three quarters inches in diameter and from 20 inches to 72 feet in length. An illuminating system is incorporated with lamp in objective attachment and a current supply attached to eyepiece head

by means of a short connector carrying circular contacts.

Photographs can be taken through the instrument using a special photographic attachment fitted to eyepiece. Optical system consists of one eyepiece tube and one objective tube, plus a number of extensions with built-in optical systems. Extensions are fitted to each other by means of conical joints to allow inspection at various depths. Instrument is furnished in a fitted hardwood case with spare lamps, flexible cord, and clamps for use in assembling and dismantling tube joints.

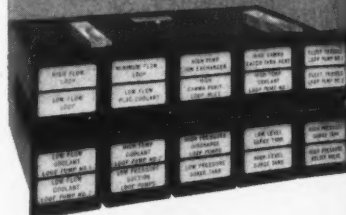
(Model TG-5 Zeiss-Kollmorgen Boreoscope is product of Kollmorgen Optical Corp., Dept. CP, 347 King Street, Northampton, Mass. . . or for more information check 6605 on form which is located opposite last page.)

why is this magazine so "different"?

Maybe you have wondered why this magazine, CHEMICAL PROCESSING, has such an unusual format? Or why it comes to you without subscription price? Or why its articles are so terse, short, to-the-point?

The Editors explain how this benefits you—page 118.

Never Before Such A Versatile, Low Cost ALARM SYSTEM!



SCAM DU-ALL
(Patent 2,730,704)

Scam Model SC-10 DU-ALL annunciator systems introduce new standards for compactness, usefulness and economy. Available in four standard cabinet sizes with Scam's unique plug-in relays, plug-in light boxes with 2-section back lighted nameplates. Each plug-in and light box combination provides alarm indication for two separate and unrelated field conditions . . . Write or phone for information on your specific alarm problem.

ALARM SEQUENCE:

Normal: lights off, horn off
Abnormal: lights flashing, horn on
Reset: lights bright, horn off
Normal again: lights off, horn off

Features of the SC-10 MODEL

1. Interchangeable with standard Scam systems.
2. Operates with normally open field signals.
3. Optional Lock-in of momentary alarms.
4. De-energized circuit (no-drain).
5. Photograph illustration above with 20 alarm stations requires panel area of only 7 1/2" high x 17 1/2" wide.
6. Two lamps for each indication.
7. Economical.

**THE
SCAM
INSTRUMENT CORP.**

Chicago 18, Illinois
Phone IRving 8-9334

SALES REPRESENTATIVES:
Atlanta • Boston • Buffalo • Chicago
Cincinnati • Cleveland • Dallas • Detroit
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Philadelphia • Pittsburgh • Portland
St. Louis • San Francisco • Seattle • Tulsa
Toronto and Vancouver, Canada

When inquiring check 6606
opposite last page

CHEMICAL PROCESSING

When inquiring check 6604 opposite last page

**Determines odor threshold
in natural and liquid
propane gas . . .**

does not require conversion or calibration
curves to use

Uses: Measuring odorant in natural and liquid
propane gases.

Features: Odor instrument reads directly in
terms of per cent gas by volume.



Portable instrument determines odor threshold

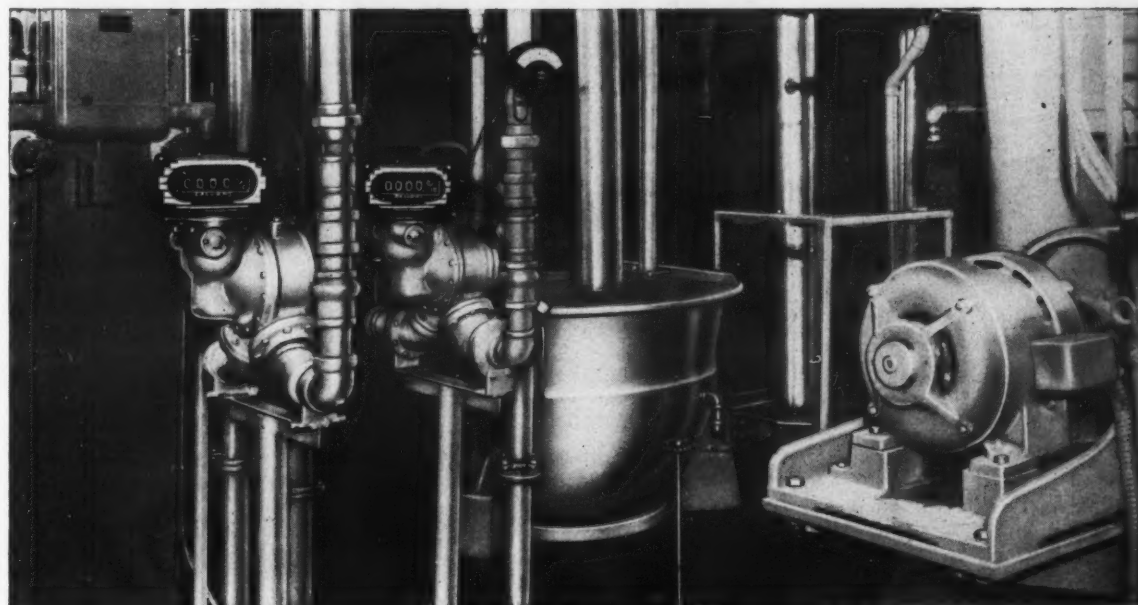
Description: Instrument is battery operated.
Operates on Wheatstone bridge filaments and
measures odor threshold or lowest concentration
of gas that can be detected easily.

(Odor tester is product of Davis Emergency Equip-
ment Co., Inc., Dept. CP, 45 Halleck St., Newark,
N. J. Check 6607 on form opposite last page.)



Rockwell Stainless Steel Meters

MEASURE CORROSIVE LIQUIDS—FAST!

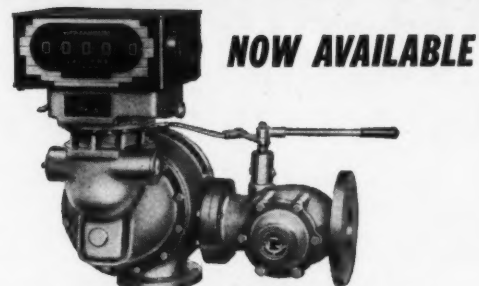


For Foods, Pharmaceuticals, Chemicals and Liquors

These Rockwell meters are constructed *inside and out* of stainless steel. With them you can get positive liquid accounting over a multitude of fluids that cannot be measured by ordinary meters. You can use them *with profit* to cut liquid handling and processing costs, to guard the quality of your end products, to stop losses. And your accountants will welcome these meters for cost control and tax analysis purposes. Get full facts now. Use the handy coupon—or write for bulletins.

Use For All These Purposes

- Liquid Delivery Control
- Formula Control—Cost Control
- Product Quality Control
- Departmental & Inventory Control



Automatic Pre-Set Meter Shut-off *without shock.* All stainless construction. Just pre-set the quantity to be measured, then meter and automatic valve take over to shut-off flow in three (3) smooth successive stages without harmful hydraulic shock.

—CLIP COUPON MAIL TODAY—

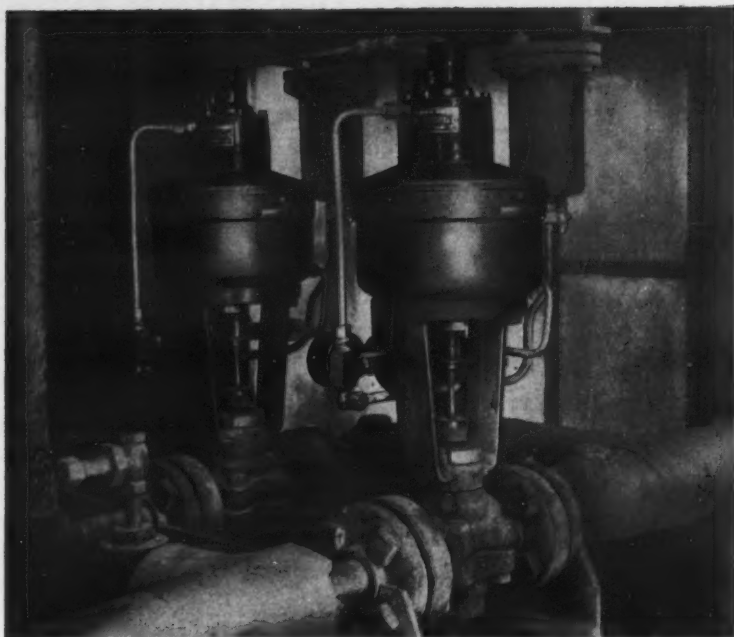
ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pennsylvania Dept. 106G

Gentlemen:

I am interested in measuring _____ (Name of Liquid)
Pipe Size _____"
Working Pressure _____ psi Temperature _____°F max.
Max. Flow Rate _____ gpm Min. Flow Rate _____ gpm
YOUR NAME _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____



When inquiring check 6608 opposite last page



600 to ONE CUSTOMER PROVES SATISFACTION...

THAT'S THE STORY BEHIND THESE CONOFLOW Series LB CONTROL VALVES

Photo shows an original installation of Conoflow Series LB Control Valves that has been on a temperature control application for several years. There are now over 300 of these valves in operation at this large manufacturing plant. By the end of the year there will be approximately 600 LB valves throughout the plant. Out of respect for our customer's company policy we cannot publish the name. However, the volume of valves involved proves that Conoflow Series LB Control Valves are eminently satisfactory to this prominent user.

The tandem operation shown is a typical application—cooling and heating—utilizing split ranges. One valve handles cold water with a 3-9 psi range. The other handles steam with a 9-15 psi range.

The revolutionary Cylinder Conomotor provides greater speed of response, tight shut-off and other performance characteristics superior to conventional valves. Downtime is practically nil compared with other valves.



Catalog LB-1 tells the complete story of the benefits in Conoflow Series LB Control Valves. Write for your copy. Conoflow representatives are located in most principal cities.

CC-602

CONOFLOW CORPORATION
SUBSIDIARY OF WALWORTH COMPANY
2100 ARCH STREET • PHILADELPHIA 3, PA.

When inquiring check 6609 opposite last page

INSTRUMENTATION

**Minimizes safety hazards
of tying down switches
during repairs . . .**

rod actuator of switch returns to "normal"

Uses: As door interlock switch to cut power automatically when service door of junction box is opened.

Features: Interlock switch has rod actuator which allows circuits to be checked with power on.

Description: Manually pulling the rod actuator to maintained contact position closes circuit for checking. When door is closed, rod actuator returns to position. The next door opening will again break the circuit. Electrical rating of switch is 5 amp at 125 or 250v AC. Contact arrangement is SPDT.

(Interlock switch 7ACI-T is product of Micro Switch, Division of Minneapolis-Honeywell Regulator Company, Dept. CP, Freeport, Illinois . . . or for more information reader may simply check 6610 on form which is located opposite last page.)



"Whud' yu say about the sink, Charlie?"

Cartoon by Clair D. Wickman, of the Upjohn Co., Kalamazoo, Mich.

Petrometer SERIES 1400 LIQUID DEPTH GAUGES

ACCURATE and EASY TO INSTALL

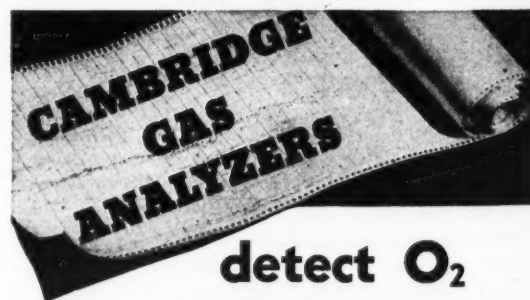
Available in 4 Models, Petrometer Series 1400 Tank Gauges operate on the sound principle of hydrostatic pressure. No moving parts, no expensive electrical or electronic equipment. Large vertical scale gives accurate, easy-to-see reading. And construction features make installation easy.

For complete
information send for
Bulletin 6004

Petrometer
CORPORATION

43-22 TENTH ST., LONG ISLAND CITY 1, N. Y.

When inquiring check 6611 opposite last page



detect O₂ in feed water

Continuous records of the oxygen dissolved in boiler feed water and of the hydrogen entrained in steam, indicate when corrective measures are necessary to prevent otherwise unsuspected and costly corrosion. Cambridge Analyzers measure and record dissolved oxygen directly. The hydrogen in the steam is measured and indicates the quantity of oxygen set free by dissociation. Cambridge instruments are available for continuously recording either O₂ or H₂ separately, or O₂ and H₂ simultaneously.

Send for Bulletin 148 B. P.

CAMBRIDGE
INSTRUMENT CO., INC.

3512 Grand Central Terminal • New York 17, N. Y.

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

When inquiring check 6612 opposite last page

CHEMICAL PROCESSING

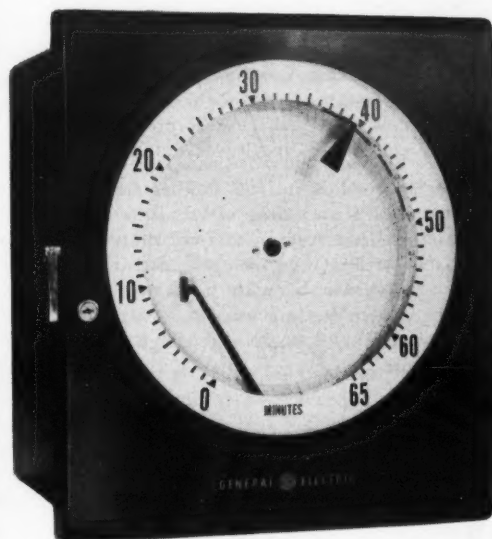
Reads directly and records continuous process time of ovens and kilns . . .

receives signal from tachometer generator proportional to conveyor speed

Uses: Direct reading and recording of time in process for continuous ovens, furnaces, kilns, lehrs.

Features: Potentiometric round-chart recorder is continuously standardized using a magnetic standard as reference.

Description: Recorder is used with a tachometer generator connected to a conveyor belt drive. Tachometer generator furnishes a signal propor-



Records process time directly in minutes

tional to conveyor speed. Speed signal from generator is converted by slide wire coupled to self-balancing potentiometric recorder. Process time is thus recorded directly in minutes.

(Potentiometric round-chart recorder is product of Instrument Dept., General Electric Co., Dept. CP, Schenectady 5, N.Y. . . or for more information check 6613 on form opposite last page.)

Explains use of magnetics for indicator

Eight-page bulletin explains magnetic instrument for measuring deflections. Some operating instructions are given together with schematic diagrams, engineering specifications, and illustrations.

"Deflection Indicator" is issued by Allis-Chalmers Mfg. Co., Dept. CP, 1151 S. 70th St., Milwaukee, Wisc. Specify 6614 opposite last page.

wherever precise flow measurement is critical . . .

Potter TURBINE TYPE FLOWMETER

ACCURATE, DEPENDABLE POTTER FLOWMETERS are being specified by more and more chemical processors each year for jobs that demand high reliability, high precision, low maintenance, extreme control precision. Available in sizes from $\frac{1}{8}$ " to 6" units, they measure caustics, acids, corrosives, unstable compounds, suspensions, super-refined liquids and other hard-to-handle liquids at temperatures up to 1200°F and at pressures to 35,000 psi. Easily incorporated into complex control systems because of their linear output. Potter sensing units produce a signal that can be telemetered, fed into digital information handling systems, or measured directly to indicate or control flow rate or total flow. Find out how this unique approach to flow measurement can help solve your flow-control problems. Write for Bulletin S-1.

POTTER AERONAUTICAL COMPANY • Route 22 • Union, N. J. • Phone MUrdock 6-3010
Makers of "Potter Engineered" products

When inquiring check 6615 opposite last page

PALMER-SHILE

Materials HANDLING EQUIPMENT

Engineered and Built
to meet your needs

LIFTS OPEN and CLOSED DRUMS

Vertical DRUM LIFTER

Item C-1258
\$46.50

Save valuable plant space with this improved Vertical Drum Lifter. Handled either by crane or hoist, and used where ceilings are high or low. Sure-hold safety-grip is one of its important features. All steel welded construction.

PICKS UP BARREL, BOX OR CONTAINER

BARREL and BOX GRAB

Item NS-288
(2000 lb. capacity)
\$66.20

From 40" diameter to small nail keg. Available in 1000 and 2000 lb. capacity. Toggle principle design. Rugged construction of welded steel chain with tongs of heavy bar stock. Weight app. 35 lbs.



BARRELS WEIGHING UP TO 1000 LBS.
HANDLED WITH EASE BY A

BARREL TRUCK

loads automatically

Loads from a row as easily as when barrel stands alone. Only 24" wide, permitting passage thru doors or down aisles too narrow for many trucks. All welded steel construction. Weight app. 85 lbs.

Item S-911-M \$40.55
(metal wheels)

Item S-911-R \$46.60
(rubber wheels)

Item S-911-P \$54.45
(pneumatic rubber wheels)

Prices F.O.B. Detroit Subject to change without notice

DESIGNED AND MANUFACTURED BY

Palmer-Shile Co.
16016 FULLERTON AVE. DETROIT 27 MICH.

BOSTON, Mass., CO 6-0570 • BURLINGAME, Calif., DI 2-0823 • CHICAGO, Ill., Austin 7-8599 • CLEVELAND, Ohio, SU 1-3235 • DENVER, Colo., AL 5-3984 • FLINT, Mich., CE 8-6881 • FORT WAYNE, Ind., KE 5408 • INDIANAPOLIS, Ind., ME 5-2587 • LOS ANGELES, Calif., RA 3-3733 • ST. LOUIS, Mo., PR 1-1474 • WHITE PLAINS, N. Y., White Plains 6-1354

When inquiring check 6616 opposite last page

material handling

Dryers were either overloaded or empty . . .
Now—output of batch centrifuges is handled by

feeding continuously to rotary dryers

for increased dryer efficiency

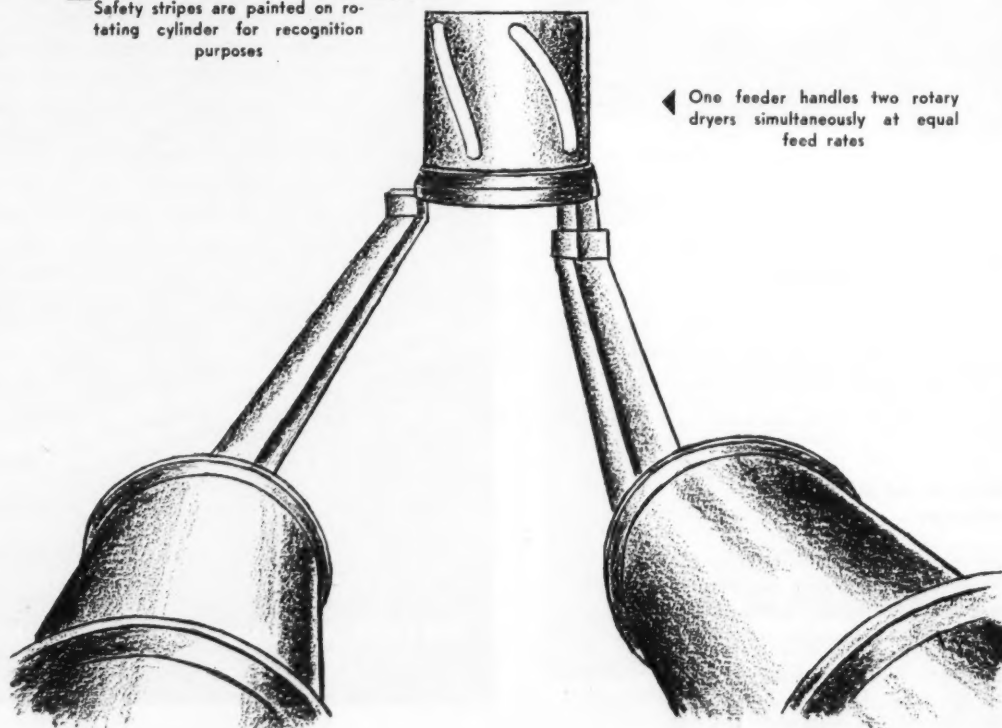
WILLIAM C. CLARKE, Assistant Editor



CP Staff Photo
Safety stripes are painted on rotating cylinder for recognition purposes

Problem: An East Coast fertilizer plant was "slugging" its rotary dryers with wet crystals of trisodium phosphate and getting poor moisture uniformity and under-capacity dryer operation.

Slurry of 94% solids in TSP mother liquor was batch centrifuged and then elevated to a screw conveyor for direct feeding of two rotary dryers. Wet crystals of TSP were being loaded into both dryers — batchwise — with peak overloads of dryers. This batch feeding was producing a product that would cake easily in storage and give trouble in use.



One feeder handles two rotary dryers simultaneously at equal feed rates

Solution: Company installed a feeder and surge bin to handle "gunk" from the centrifuges and provide a uniform feed to two dryers, smoothing out intermittent charges to a continuous stream to the dryers.

Feeder consists of a cylindrical shell mounted on a rotating vertical shaft with spider arms. On the same shaft but mounted below the cylinder, is a circular plate larger in diameter than the cylinder. There is a gap between the plate and bottom of the cylinder. Height of this gap can be varied to suit rate requirements of material being handled. Two stationary plows, each set at the correct angle, extend through gap. As cylinder, material, and plate revolve, these two plows continuously remove a stream of TSP from bottom of mass in the cylinder, discharging it from edge of the plate. Discharge rate is varied by thickness of the two plows, gap setting, distance plows extend into material, and speed at which entire feeder turns.

Since TSP can be handled in black iron, construction is of mild steel. Feed rate per hour can be up to five tons per hour, two and one-half tons to each dryer. Dimensions of the cylinder are three feet in diameter and four feet high, with a holding capacity of 28 cubic feet. Motor is a 220v DC of one hp rating, actually oversize for the installation but good insurance. Motor is geared down from 1800 rpm to rotate the cylinder at 1.1 rpm.

Results: Feeder has been in operation for the past three years, providing a "metered" feed to the two rotary dryers. During that time there has been practically no maintenance other than normal lubrication. Product is more uniform and dryer efficiencies have been increased.

(Con-Bin Feeder is product of Pulva Corporation, Dept. CP, 550 High St., Perth Amboy, N. J. . . . or for more information check 6617 on form opposite last page.)

Shows complete line of casters

Two-color, four-page catalog shows full line of casters . . . steel forged, cold forged, and stamped steel in capacities from 150 lb to 3000 lb. Recommended uses for each type are listed.

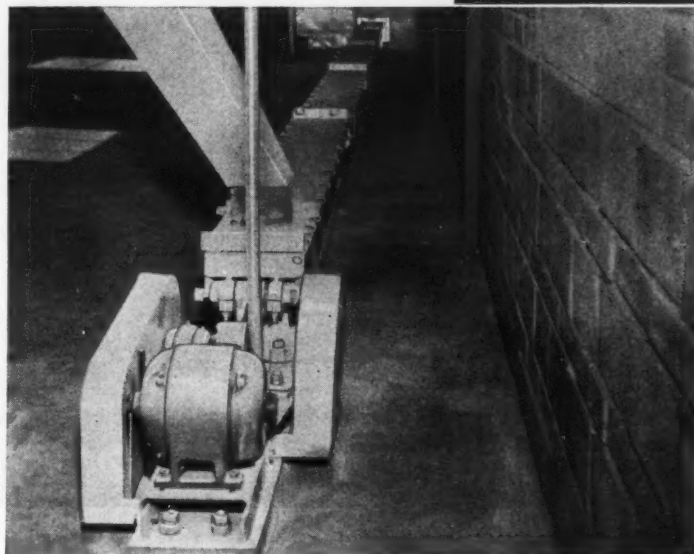
Also illustrated and described are eight types of wheels with a wide range of performance characteristics for almost any industrial or commercial application.

Form CW-56 is issued by The Rapids-Standard Co., Inc., Dept. CP, 342 Rapistan Bldg., Grand Rapids 2, Mich. When inquiring reader may simply specify 6618 on Reader Service slip which is located opposite last page.

Link-Belt Flexmount Oscillating Conveyors

stocked locally...

LINK-BELT FLEXMOUNT OSCILLATING CONVEYORS are pre-engineered—can be bought direct from your local Link-Belt outlet. Standard sections of 8, 12 and 18-in. widths make selection easy . . . assembly simple. Heavy-duty 36-in. wide units are also stocked.



installed quickly...

FLEXMOUNT OSCILLATING CONVEYOR at mid-west milling firm keeps material moving in even flow regardless of surges. These conveyors can be furnished with: stainless steel or galvanized troughs . . . dividers to handle several materials simultaneously . . . jacketed trough for heating or cooling en route. Ideal for handling material where cleanliness, contamination or corrosion are factors.

If you need a conveyor for moving granular or lumpy, hot or cold, corrosive or abrasive materials—and need it NOW—investigate Link-Belt Flexmount Oscillating Conveyors. They're available from stock in pre-engineered sub-assemblies for conveyors up to 100-ft. long.

Flexmount is easily and quickly installed, simple in design, and requires minimum of space. Continu-

ous, leak-proof, self-cleaning metal trough is supported on sturdy, resilient legs. Heavy-duty, sealed roller bearings in drive need only periodic lubrication.

See this versatile conveyor at your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Call him today or write for Book 2478.

How Positive Action moves material



Positive-action, constant-stroke eccentric provides a powerful, yet gentle upward and forward oscillating motion. Large volumes of material are moved in a uniform, continuous flow, regardless of surges. Resonant spring action of resilient legs cuts power requirements to a minimum.

LINK-BELT

FLEXMOUNT OSCILLATING CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 6619 opposite last page

MATERIAL HANDLING

Introduces oscillating unit for car unloading

Six-page folder, printed in three colors, describes boxcar unloader which uses oscillating motion to empty free-flowing bulk material from railroad cars at rates of four cars per hour. Unit takes standard railroad boxcar weighing up to 150,000 lb loaded, locks it in its grasp on a steel structure, and then, by means of oscillating or rocking motion, empties the load. Illustrating operation with pictures and drawings, bulletin points out advantages of system.

Folder 2645 is issued by Link-Belt Company, Dept. CP, Prudential Plaza, Chicago 1, Ill. When inquiring reader may simply specify 6620 on the convenient Reader Service slip which is located opposite last page.

Spring-loaded pawls aid pallet pick-up

Redesigned line of operator-led trucks includes pallet models, high and low-lift platform trucks, high-lift suspended load stackers and tractors.

Spring-loaded pawls on pallet models hold unloaded pallet firmly while forks enter, eliminating — in most cases — the need for chamfering of end boards on double-faced pallets. Three-point lubrication allows all load bearing surfaces to be lubricated regu-



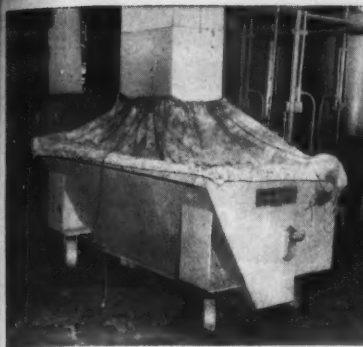
Trucks measure only 21½ inches plus load length yet have standard 8¼ inch battery compartment



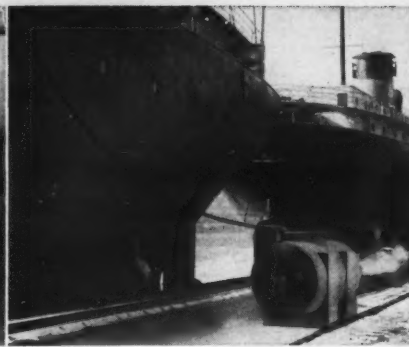
Here's **MASS-HANDLING** of bulk

What you see above is a Dempster-Dumpster serving one of its detachable containers. Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids including acids, combustibles, dusty materials, etc. You have, then, mass-handling of bulk materials with one truck and one man!

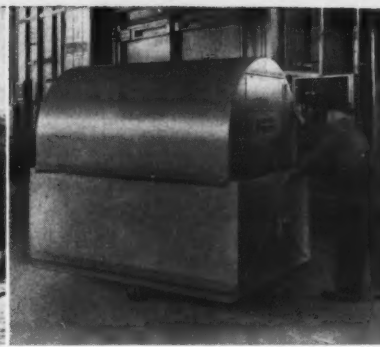




Tilt Type Container is handling filter dirt at a plant in Illinois. Note container is equipped with casters and placed under chute, through which the filter dirt passes directly from presses. As each container is filled, it is replaced with an empty one.



Tank Type Container is being filled with used oil from a ship. Time required to haul loaded container to reclaim station, drain and return for refilling—10 minutes. Time cycle of the former method using conventional barrels—60 minutes.

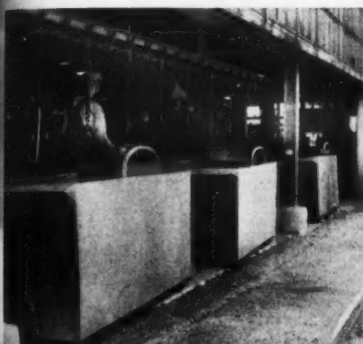


A loaded Apartment Type Container, equipped with roller bearing casters, is being rolled to outside of this plant building. Dempster-Dumpster will pick it up, haul to disposal area, dump the refuse and return empty container for refilling.

Three heavy duty Drop Bottom Type Containers, shown below, are loaded with cast iron fittings from conveyor at plant in Birmingham. Dempster-Dumpster picks up each container when loaded and hauls the finished products to shipping department.

Here's another example of the many types of waste materials handled by this system. The Skip Type Container shown below is located under hydropulper at a paper plant. Picture was shot while container was being filled with rope waste sludge.

Waste materials are loaded into these Universal Containers at a food plant warehouse. Containers have lids on top, as well as a door in each end, which are opened to make deposits, then closed, sealing materials in container.



Like materials with one truck...one man!

A FEW OF THE HUNDREDS of containers available are shown above in actual service. They are built in capacities up to 21 cu. yds.—several times the capacity of the average dump truck body. One Dempster-Dumpster, operated by only one man, the driver, serves scores of big detachable containers, one after another—handling materials of every description. It's like having one truck with scores of bodies!

Records of performance in dozens of installations prove beyond question that savings are tremendous! The Dempster-Dumpster System cuts costs of equipment and operation. It is common knowledge that one Dempster-Dumpster will perform the work of several conventional trucks, reducing investment ac-

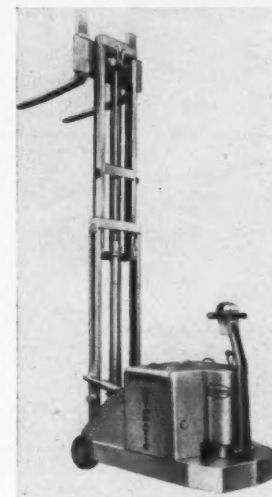
cordingly. This system eliminates standing idle time and re-handling of materials. Once placed in these containers, materials remain there until hauled to destination. Efficiency, sanitation and good plantkeeping are big advantages. Materials to be transferred or disposed of are constantly being placed in the containers as they accumulate. Containers for handling refuse are fire-proof, rat-proof and scavenger proof.

With no obligation on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Write us for complete information today! Manufactured exclusively by Dempster Brothers, Inc.

DEMPSTER BROTHERS

276 N. KNOX, KNOXVILLE 17, TENNESSEE

larly in a matter of seconds. Trucks measure only 21½-inches plus length of load yet have standard 8¼-inch battery compartment.



Three-speed control permits operator to inch truck smoothly

Three-speed control permits operator to inch truck forward or back and prevents too-fast starts. Drive wheel tire changes can be made in three minutes. Steel plate securing wheel, when removed and reversed, becomes wheel puller, eliminating need for special tools.

Moving parts in all gear-driven power head, including fully shielded ball bearing race, are all lubricated automatically by oil in housing.

(Line of trucks are manufactured by

Automatic Transportation Co., Div. of Yale and Towne Mfg. Co., Dept. CP, 149 W. 87th St., Chicago 20, Ill. . . or for more information check 6621 on form opposite last page.)

Describes equipment for bagging

Catalog of 36 pages describes line of equipment for carloading, conveying, and similar operations as well as some laboratory equipment. Giving descriptions and prices, booklet contains such items as booster conveyors, bag fillers, lab scales, and outdoor storage facilities.

1955-56 Catalog is issued by Burrows Equipment Co., Dept. CP, 1316 Sherman Ave., Evanston, Ill. When inquiring specify 6622 on form which is located opposite last page.



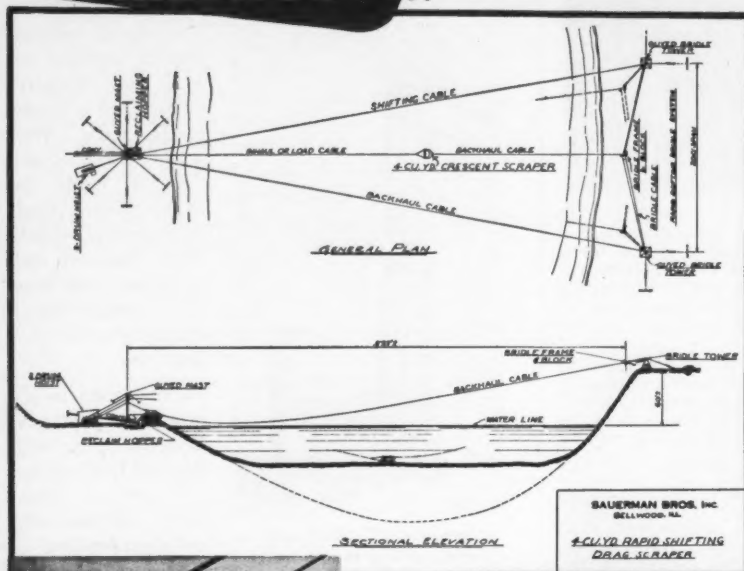
don't look now —

. . . but this magazine you are reading, **CHEMICAL PROCESSING**, comes to you without subscription price. Why?

Read what the Editors say on page 118.

the SAUERMAN METHOD

Scraper Machines
Engineered to
Your Operation



Above drawing was prepared for a specific drag scraper installation and does not represent maximum spans.

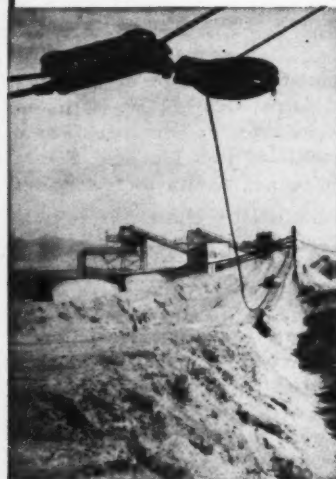
The Sauerman Method works equally well over widely differing areas and span limits . . . on hills, swampy ground or underwater . . . handles any material a dragline can dig.

Every scraper machine is powered by a Sauerman Roller Bearing Hoist, especially designed to withstand sudden shocks and changes in speed.

When a rapid shifter is used, a third hoist drum is added to shift the bridle frame. The rapid-shifting bridle system (upper right of drawing) permits frequent shifting of the scraper's line of operation in non-caving material, shallow excavations or overburden.

Operating costs are lower—basically, it is cheaper to drag material than it is to lift and transport it. You eliminate the power costs of moving heavy machinery about the area. You pay only for pay loads—not dead weight. When expendable parts—sheaves, clutch or brake linings—are replaced, the machine is restored to practically new condition.

Sauerman can help you select the method of materials handling most profitable for your job—a system that will give you the lowest cost per cu. yd. handled.



View shows rapid shifting bridle frame and all operating cables. Crescent may be seen in background conveying load to reclaiming hopper just in front of mast.

Contact Sauerman's engineering department for specific recommendations and information. No obligation.

Ask for Catalog A, Drag Scrapers—24 pages of job photos and specifications. Request Field Reports showing your material being handled by the low cost Sauerman Method.

SAUERMAN BROS. INC.

624 S. 28th AVE.

BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cableways • Duro-lite Blocks

When inquiring check 6623 opposite last page

MATERIAL HANDLING

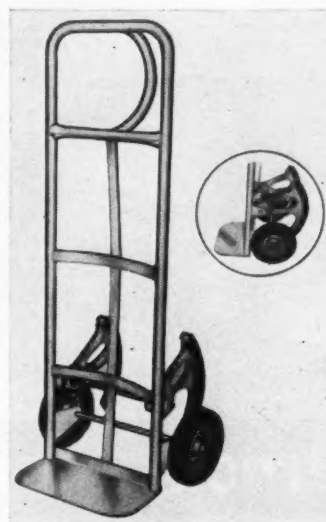
"Mountain goat" truck
climbs stairs, curbs . . .

rocker arms, part of truck frame, provide hold

Uses: Hand truck is designed for use in locations where loads must be carted over curbs or up and down stairways.

Features: Two rocker arms are part of truck frame — these provide a purchase on tread of stair or curb so that truck can be moved over these obstacles without difficulty.

Description: Welded tubular steel frame (1-inch OD tube) has



Forty-six-inch-high truck takes 600-lb load

integral rocker arms. Curbed cross members accommodate bulging loads. Nose-plate (9 x 14" wide) is of 3/16" steel with reinforced base plate beams. Tires are semi-pneumatic, 10 x 2.75", with steel disc wheels.

Load capacity of the truck is 600 lb. Overall size is 18 3/4" x 46" high. Finish is red.

(E-Z Climber is a development of Precision Equipment Company, Dept. CP, 3716 N. Milwaukee Avenue, Chicago 41, Illinois . . . or for more information about manufacturer's product reader may simply check 6624 on the convenient Reader Service slip which is located opposite last page.)

Modernizing Conveyor Lines?

CHECK Weld-Bilt STEEL-BELT CONVEYORS



Custom-engineered to your exacting needs, Weld-Bilt "moving belts of interlocking steel — or stainless steel" offer profitable advantages. Positive tracking, they cannot weave, buckle, stretch or creep. Friction-free, they run on ball bearing rollers, from positive slip-proof motor drive. And, best of all, they offer unlimited life.

"Weld-Bilt"
PRODUCTS
SPECIALTY CONVEYOR SYSTEMS

Call a Weld-Bilt engineer to help you plan new conveyor lines — or other modern materials handling equipment. Just drop a note.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

322 WATER STREET, WEST BEND, WISCONSIN

When inquiring check 6625 opposite last page

TINY
Sample or



GIANT Economy size

You can package it better

at less cost in a **Clearsit** plastic jar or vial

- 1/5 the weight of glass
- Shatter-proof
- Easy to print
- Moisture tight, dust free

There is a wide variety of shapes, sizes, colors and closures available to give your particular product extra sales sparkle. Write for free samples and descriptive literature to Dept. G.

CELLUPLASTIC CORPORATION

Sales and Executive Offices Newark, New Jersey

When inquiring check 6626 opposite last page

CHEMICAL PROCESSING

Two or more material streams controlled by reference-slave hookup

Continuous proportioning equipment enables all ingredients in a mix to be proportioned by weight. Proportioning can be controlled in an integrated combination from central control station. Materials are controlled and fed in continuous and dependent relationship to each other. Fluctuations in reference or main stream are automatically reflected in proportional changes in each of the additive or slave streams.

Adjusting main or reference stream is all that is required to control total output. If output is based on next step in process, it can be adjusted by electrically connecting the next unit to control station.

Supervision is from central control station, located at most convenient spot for overall control. . . there's no need or advantage in locating it near conveyors. At this station are grouped all controls

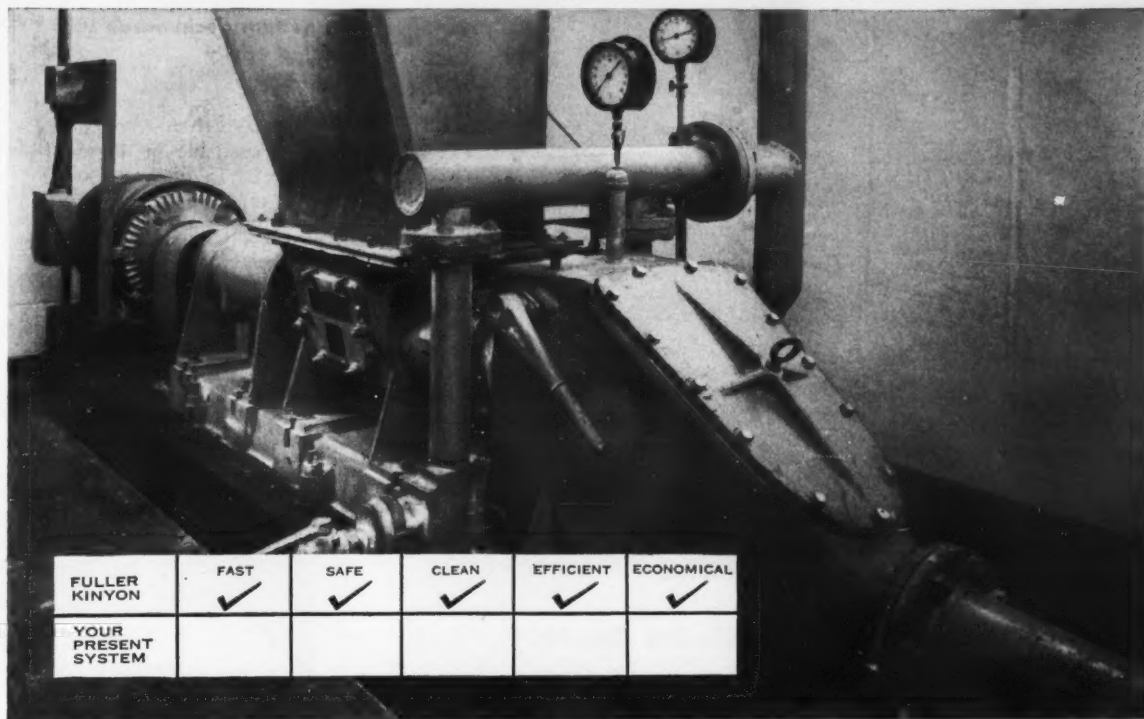


Control is done from central station, located at most convenient spot

—master "on-off", total output, recording meters for quality control and similar informative devices. Ratio can be adjusted independently of total mill output and vice-versa. Alarm systems alert personnel to malfunctions of feeding, loss of material, and similar disturbances.

(Electro-Way proportioning units are manufactured by Commercial Products Div., Bell Aircraft Corp., Dept. CP, 701 Seneca St., Buffalo 10, New York. Check 6627 on form opposite last page.)

How many can't you check...



Fuller-Kinyon pump conveying flash-dried starch to dextrine or starch bagging department at rate of 12,500 lb. an hour. Conveying distance 600 feet.

... against your present dry pulverized materials handling method?

If there's just one of these practical features that you can't claim, you can be sure that its lack is adding a substantial amount to your annual conveying costs. To move bulk Portland cement, pulverized coal, limestone dust, flue dust, fly ash, starch, pulverized phosphate rock or any other dry materials of similar consistency, a Fuller-Kinyon System designed specifically for your plant will provide the best combination of efficiency and economy available and also afford the "extras" of safety, speed and cleanliness.

A FULLER-KINYON SYSTEM:

- *harnesses air to do the work
- *eliminates fire and explosion hazards
- *operates anywhere a pipeline can be run
- *entails no complicated or costly installation factors
- *reduces maintenance sharply
- *can be operated by one man
- *eliminates spillage—waste

Proof that these advantages have been long recognized is the fact that one or more Fuller-Kinyon Systems are serving in 98 per cent of the nation's cement mills as standard primary conveyors. Take a leaf from this service record. Get the facts as they apply to your plant and put Fuller's 30 years of pneumatic conveying experience to work for you.



FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
 SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
 Chicago • San Francisco • Los Angeles • Seattle • Kansas City • Birmingham

When inquiring check 6628 opposite last page



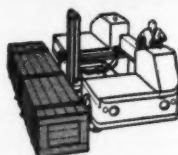
Traveloader handles bulky heat exchangers with ONE machine and ONE operator!

Here is a revolutionary new material handling machine designed expressly for long, unwieldy awkward loads. It picks up loads from the side, carries them securely on the truck deck, and stacks them to a height of 12 feet. It operates indoors or outdoors, in 10 foot aisles, over paved or unpaved roadways—and over highways at speeds up to 30 MPH.

It is ideally suited for removing, storing and installing heat exchanger tubes. Illustration shows Traveloader placing heat exchanger tubes on "Christmas Tree" racks to conserve yard storage space.

Traveloader is available with gas or diesel powered engine, in 10,000 and 12,000 pound capacities. Write for descriptive bulletin No. 1360.

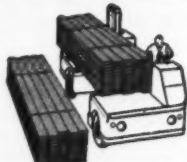
ONLY TRAVELOADER



Picks up like a straddle truck



Delivers like a highway truck



Stacks like a fork truck

Baker

handling equipment

THE BAKER-RAULANG COMPANY
1208 West 80th Street • Cleveland 2, Ohio

A subsidiary of Otis Elevator Company

676

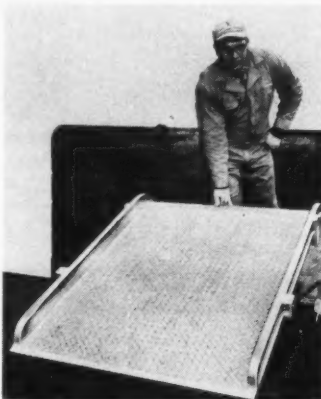
When inquiring check 6629 opposite last page

MATERIAL HANDLING

Magnesium dockboards handled easily by one man

Line of magnesium truck dockboards is available in 48 standard sizes . . . in 1000 or 2000 lb axle load capacity.

Of all magnesium construction, these boards combine bridge design strength with extreme lightness for one-man handling. Boards are crowned to compensate for height differences be-



Magnesium construction permits easy handling by one man

tween truck and dock level and can be reversed when truck gets lower than dock. Automatic drop-lock anchors board in place and prevents slipping.

(Magnesium dockboards are manufactured by Magline, Inc., Dept. CP, Pinconning, Mich. . . . or check 6630 on form which is located opposite last page.)

Stockpiling outdoors in all weather

Two-color tabloid-size publication of eight pages shows typical material handling operations involving industrial trucks. One article is concerned with outdoor stockpiling in all weather.

Vol. 14, No. 1, "Handling" is issued by Towmotor Corporation, Dept. CP, 1226 E. 152nd St., Cleveland 10, Ohio. Check 6631 opposite last page.

HERE'S HELP!



CATALOG SHOWS HOW YOU CAN CUT COSTS

and solve handling problems with

Hapman
TUBULAR CONVEYORS
for wet or dry bulk flowable materials

—metal chips—chemicals—foods

A fact-packed catalog—shows application and advantages of Hapman Chain-Flight Tubular Conveyors.

REQUEST YOUR COPY OF CATALOG C-76

Details of new metal-belt PAN-LINK Conveyor for bulk chips, turnings, broken glass, etc., available on request.

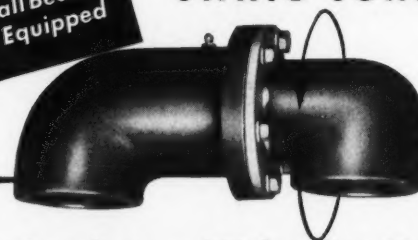


Hapman CONVEYORS, INC.
DIVISION HAPMAN DUTTON COMPANY
KALAMAZOO MICHIGAN
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 6632 opposite last page

NEW!
Ball Bearing
Equipped

BARCO SWING JOINTS



for Loading and Unloading Lines

BARCO'S new, attractively priced, all-steel ball bearing *Swing Joints* are specifically designed to provide for movement and flexibility in metal pipe loading and unloading lines handling gasoline, oil, alcohol, chemicals, and other fluids.

11 DIFFERENT STYLES—Barco offers single swing, double swing, and counterbalance styles to meet every need. Sizes 1", 1½", 2", 2½", 3", 4".

SUPERIOR DESIGN—The ball bearings will not fall out when joints are taken apart. Long bearing provides adequate pipe support. Special O-ring seal insures leakproof service over wide temperature range, -40°F to +225°F.

INFORMATION—Send for latest Catalog No. 400 and engineering information. **BARCO MANUFACTURING CO.**, 537H Hough St., Barrington, Illinois. A Chicago Suburb

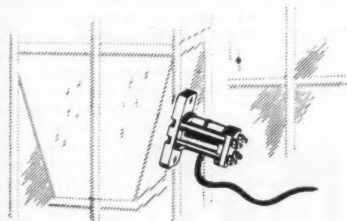
When inquiring check 6633 opposite last page

CHEMICAL PROCESSING

PUT GRAVITY TO WORK FOR YOU



Gravity is the cheapest prime mover available. It will empty bins, convey materials, aid in transportation . . . but it can't solve the problem of handling dry or viscous materials.



It takes the engineered application of Cleveland Vibrators to break up the frictional forces which cause adhesion and jamming. Vibration keeps materials moving in a full and controlled flow.

Cleveland Vibrators can be installed on all types of equipment for handling and processing chemicals. We will be happy to give you detailed data for your specific application, or a catalog for your reference files.

**Air or Electric
Portable or Permanent
Silent or Standard**



2706 Clinton Avenue • Cleveland 13, Ohio

When inquiring check 6634
opposite last page

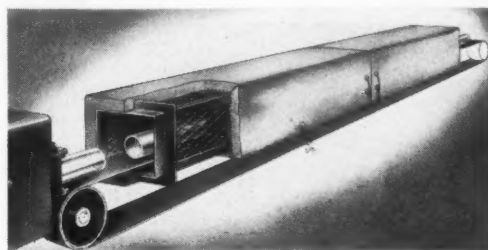
MATERIAL HANDLING

**Replaces ceramic chambers,
heats on conveyor
to 1100°F . . .**

heating blankets are available in standard lengths, permit any size installation

Uses: Typical applications of heating blankets are curing rubber products, such as silicone rubber parts, roasting and drying various foods, drying and roasting granular chemical materials, such as catalysts.

Features: Blankets can be designed for conveyor belts of any length or width. Units are de-



Blanket is supported by expanded metal form

signed in a series of four to eight feet lengths, providing flexibility for installation and maintenance.

Description: Blankets surround expanded metal form, through which conveyor belt and work load passes. Heating elements are of resistance wire, imbedded in layers of glass fabric.

(Glas-Col heating-chamber blankets are available from Glas-Col Apparatus Company, Dept. CP, 711 Hulman Street, Terre Haute, Indiana . . . or check 6635 on form opposite last page.)



"Stop the presses!"

Irving Weissman, of Shell Oil Company's Houston Refinery, sent us the idea for this cartoon.



PICK-UP PACK... ONE-TON SIZE

Each of these Drumpak corrugated containers holds 2000 lbs. of bulk granular chemicals. This same amount was formerly packed in 20 hundred-pound units. By consolidating his product in Drumpaks, this manufacturer reduced handling manhours by 80%. The Drumpak is easy to pick up, warehouse and load into freight cars.



CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

Drumpaks are another Gaylord development. To learn how you can cut costs with any type of corrugated or solid fibre container, contact your nearby Gaylord office.

GAYLORD CONTAINER CORPORATION • ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check 6636 opposite last page

Robinson Conveyor

The
*Low-volume
Air Conveyor*

► Heart of the Robinson Air-Activated Conveyor System . . . the Activator which so "fluidizes" the charge, enabling it to be handled with low volumes of air.



Averages 1 Cubic Foot of Air per Pound of Materials Handled

Right here is one reason — and a stand-out reason — why the Robinson Air-Activated Conveyor is so economical in handling bulk dry-pulverized and fine-granular materials. Compressed air costs money so, if you can hold air costs down, as with the Robinson, you keep handling costs down. And no other power is necessary to operate a Robinson System.

The reason why the Robinson System can operate with such low air volume is due to the fluidized nature of the charge when transported through the pipes. Pressure alone will not suffice. It requires this Robinson Air-Activation or fluidizing effect. Material "flows" rather than blasts through.

Many Robinson Systems are in service handling a variety of products and in some cases are transporting them several thousand feet. This system may be just what you need for handling those dry, bulk materials in your plant. It has several outstanding features which we'll be glad to discuss at your convenience.

ROBINSON



A Division of
Morse Bouloger Destructor Co.

CONVEYOR SYSTEMS

80-T FIFTH AVENUE • NEW YORK 11, N. Y.

Representatives in Principal Cities

When inquiring check 6637 opposite last page

MATERIAL HANDLING

"Shoes", chime hook aid placement of drums on pallet

Drum and barrel truck equipped with "shoes" allows operator to easily place drums on pallets. Shoes are placed on edge of pallet so that one forward motion elevates drum to pallet with a minimum of operator effort. Truck permits drums to also be lowered safely from pallets.

Spring operated chime hook drops over barrel edge as truck is moved against barrel, without operator touching either hook or barrel.

Main frame of truck is constructed of steel tubing or is available in aluminum. Unit has one inch



"Shoes" allow barrels to be placed on pallet with minimum operator effort

diameter axle. Wheels are equipped with ball bearings and solid rubber tires. Pneumatic wheels are available.

(Ezy-Rol Barrel Cart is manufactured by Valley Craft Products, Inc., Division of O'Neil-Irwin Mfg. Co., Dept. CP, 770 Jefferson Ave., Lake City, Minn. Check 6638 opposite last page.)

Construction equipment described

Sixteen-page booklet, printed in two colors, describes complete line of heavy duty construction and earth moving equipment. Giving brief description and specifications on each unit, booklet covers such items as crawler tractors, graders, motor scrapers, wagons, and power units.

Form MS-1107-563 is issued by Allis-Chalmers Manufacturing Company, Dept. CP, Box 512, Milwaukee 1, Wis. When inquiring specify 6639 opposite last page.

NEW TYPE
ELECTRO-PERMANENT MAGNETIC

UNIT VIBRATOR

introduced by **ERIEZ**

No other Unit (Bin) Vibrator like this! Eriez Magnetic "know-how" brings you the first complete line of Electro-PERMANENT Magnetic Unit Vibrators operating at 3600 CPM directly off an AC line. Just plug or wire them in.

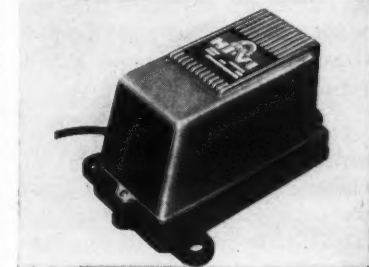
NO RECTIFIER NEEDED

AND LOOK AT THESE ADDITIONAL HI-VI ADVANTAGES
Lower Maintenance and Operating Costs

. . . Longer, Trouble-Free Service . . . Versatile Units Provide Broader Operating Ranges with Less Power Consumption . . . HI-VI units are Compact, Lightweight, Easily Installed, never need re-aligning . . . No Sliding or Rotating Parts to Wear, No Lubricants Needed . . . Noise Factor is reduced, working conditions improved

. . . New type "Double Action" drive provides high operating efficiency with low operating cost . . .

Pat. Pending
UNIT BIN VIBRATOR



Don't bang that bin! An Eriez HI-VI Unit Vibrator keeps your bulk materials flowing freely and evenly through hoppers, bins and chutes. Prevents pile-ups, arching, bridging and sticking. Any product, in lump or powdered form, is kept moving freely in a steady stream by HI-VI's "Double Diaphragm" or kneading action. Eriez HI-VI Unit Vibrators work equally well on any hopper, bin or chute, any size or shape. Eriez HI-VI Vibratory Feeder is offered also . . . it gives liquid-like flow to bulk materials for even, measured feed, variable from ounces to tons per hour. Same new, exclusive principle is back of its amazing money-saving performance in weighing, batching, proportioning operations.



These products are the latest developments of Eriez Manufacturing Co., world famous producer of permanent-powered Magnetic Separators.

For full information on new HI-VI Vibratory Equipment, write: Eriez Manufacturing Company, 73G Magnet Dr., Erie, Pa.

When inquiring check 6640
opposite last page

CHEMICAL PROCESSING



Service means...

**completeness
of the line**

Vulcan makes top quality steel open head pails, closed head drums. Sizes; 1, 1½, 2, 2½, 3, 3½, 4, 5, 6, 6½, 10, 12 gallons with all types nozzles and pouring spouts. Complete lithography facilities available. Wide color selection for plain containers.



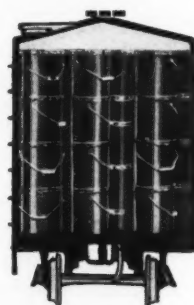
**packaging
research**

Vulcan's modern research facilities are constantly at work developing and improving protective interior linings for all types of products... It's your answer to positive protection whether product is used immediately or stored indefinitely.



**ready
availability**

Vulcan's constant inventory of all Standard pails speeds your order. Modern railroad and truck docks mean quick loading, immediate dispatch. From carton to carload or truckload—when delivery is important—call VULCAN!



OVER 40 YEARS CONTAINER EXPERIENCE

**VULCAN
CONTAINERS INC.**

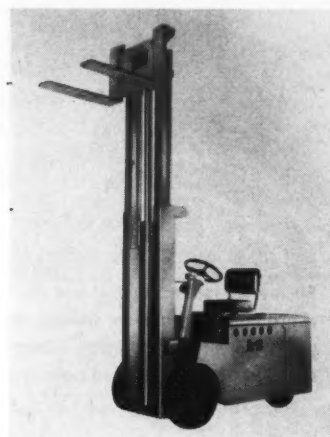
Bellwood, Illinois (Chicago Suburb) Phone: Linden 4-5000
In Toronto, Canada—Vulcan Containers Limited.
Representatives in all Principal Cities

MATERIAL HANDLING

**Turns with 4-foot load
in 142-inch aisle**

Industrial truck line features rear wheel gear drive powered by two heavy-duty, compound wound traction motors with an electric differential. Entire drive assembly is spring-mounted to assure constant traction on both drive wheels at all times.

Rear-wheel drive provides maximum maneuverability. Truck can



Truck provides lift height of 130 inches with collapsed height of 83 inches

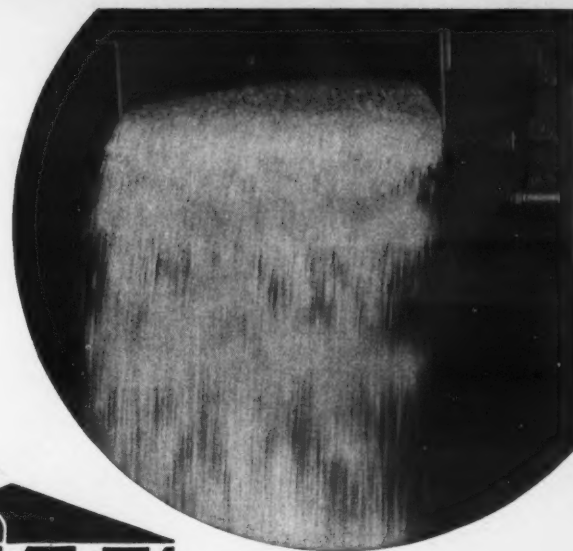
pivot about a point on truck's center line rather than a point outside one of the load wheels.

High-pressure (2800 psi) hydraulic system provides lifting speed of 25 fpm with 7000 lb load and empty lift speed of 30 fpm.

Unit has lift of 130 inches with collapsed height of 83 inches. Overall length is 130½ inches with 36-inch long fork and overall width is 42 inches. Unit will right-angle stack 48-inch loads in aisles only 142½ inches wide.

Unit has four speeds forward and one reverse, with automatic acceleration and dynamic braking. Hydraulic brakes are located within load wheels. Sealed bearings are used throughout truck.

(PowerMaster Model "RR" line of industrial trucks is manufactured by Lewis-Shepard Products, Inc., Dept CP, Watertown, Mass. . . . or for more information Check 6642 opposite last page.)



AJAX LO-VEYORS

**CONVEY MATERIALS
fast, easy and at low cost**

Write for Bulletin



Anyway you look at it, materials handling is a non-productive operation. There is no money in moving bulk materials by antiquated methods. That's why the Who's Who of American industry are cutting costs and speeding up production with Ajax Lo-Veyors.

They are self-contained vibrating conveyors ready to set in place and use. Easy installation on your floor, below your floor or suspended from wall or ceiling.

Widely used for long runs, short runs, hot and cold materials. Meets the most rigid sanitary requirements. Tubular and covered pan models successfully used under explosive conditions. Low first cost...low operating cost...low maintenance cost.

Available in open or closed pan and tubular types in various lengths, widths and capacities.

AJAX FLEXIBLE COUPLING CO. INC.

Westfield, New York

When inquiring check 6643 opposite last page

When inquiring check 6641 opposite last page

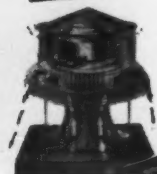
JULY 1956

SAFE

moisture and fume
removal

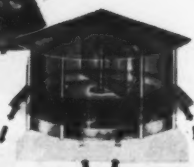


Three outstanding features make Air-Van Power Exhausters especially suited for exhausting moisture and corrosive fumes.



Direct Drive
150 to 11,000 CFM.
S.P. to 4".

Belt Drive
3,000 to
65,000 CFM.
S.P. to 4".



- A patented scroll design assures positive air removal. Gallaher Air-Vans are designed to handle up to 65,000 CFM at static pressures to 4".
- The motor is out of the air stream.
- A patented air seal-off protects the motor by creating a constant curtain of fresh air around the motor shaft. This prevents any fumes from entering the motor housing.
- Other Air-Van features include quiet operation, low silhouette, weather-proof design, availability in special metals and finishes and certified ratings based on actual physical tests.

Patents 2188741. 2526290
Patents pending

The GALLAHER Company

4108 Dodge Street Omaha, Nebraska
Export Office: 306 Paul Bldg., Utica 2, N. Y. Cable "Keiserquip"

When inquiring check 6644 opposite last page

POSITIVE PROOF of PRACTICAL SAFETY



Type 2 Safety Cans (Above) minimize risks in pouring, permit faster filling of portable power units, etc. Labeled Underwriters' Laboratories and Factory Mutuals.



Justrite Plunger Cans for safe dispensing of flammables for cleaning, sponging, etc., are available in 3 sizes. FM approved.

Justrite Approved Safety Cans on the job throughout your plant are evidence of safe practice . . . and of economy and efficiency.

Easier handling and pouring of flammables, conservation of costly solvents, lower insurance charges, less replacements of containers; all are your dividends wherever Justrite Cans are used.



Type 1 Safety Cans available in 7 sizes (one pint to 5 gallons) store safely, pour easily. FM approved, U.L. labeled. Type 1 Cans are also available hot tin dipped or in stainless steel.

FOR OILY WASTE AND RAGS

Justrite Oily Waste Cans are built to stand punishment. UL labeled. FM approved. In 5 sizes, 6 gal. to 40 gal. capacity.

ASK YOUR SUPPLIES DISTRIBUTOR OR WRITE FOR CATALOG
JUSTRITE MANUFACTURING COMPANY • CHICAGO 14, ILL.

When inquiring check 6645 opposite last page

safety



Over-fill alarm, powered by CO₂, operates independently of electrical or electronic controls

Preventing loss of product and fire hazard caused by over-filling of petroleum storage tanks can get to be a pretty complicated business. Atlantic Refining Company, Linden, N. J., has installed horn system to . . .

warn of tank overflow

without wires, power, or operator attention

Overfilling of petroleum storage tanks is not only costly but creates great fire and explosion hazards. Fill-level indication on remote filling operations can be accomplished in a number of ways — most of them requiring communications lines or electronic equipment. Atlantic Refining Co., at its Port Newark bulk terminal, was searching for a dependable yet inexpensive method of controlling fill without use of such equipment.

Atlantic installed, as a solution to its problem, a system of audio warnings — audible 1000 feet away. Units are powered by CO₂, but Freon 12, nitrogen, or compressed air may be used. Unit will sound a sharp two-minute warning to pumping crews on tankers or to land-stationed crews.

Horn system consists of a two-inch diameter steel cylinder of compressed gas about 12 inches long, pressure gage, horn as-

sembly, and float-operated valve assembly. When liquid level in tank nears the safe filling limit, float actuates mechanical linkage to horn unit and opens valve, releasing compressed gas. Signal is rated at from 116 to 122 decibels, from 31 to 37 decibels louder than required in approved fire alarm systems.

Unit requires no outside power and is completely divorced from other warning or indicating systems.

Special weatherproof cover assemblies are available to shield the horn, valve assembly, and pressure gage from inclement weather. Units may be recharged from standard cylinders of compressed gas.

(Overflow warning system is product of Falcon Alarm Co., Dept. CP, 243 Broad Street, Summit, New Jersey . . . or for more information check 6646 on form opposite last page.)

**Weights only 35 lb,
can be carried to site
for testing**

Oxygen and combustibles tester has two oxygen ranges — 0 to 5 and 0 to 21 percent

Uses: Designed to meet testing requirements for various combustion processes, unit is for measurement of oxygen and other combustibles in exhaust gases.

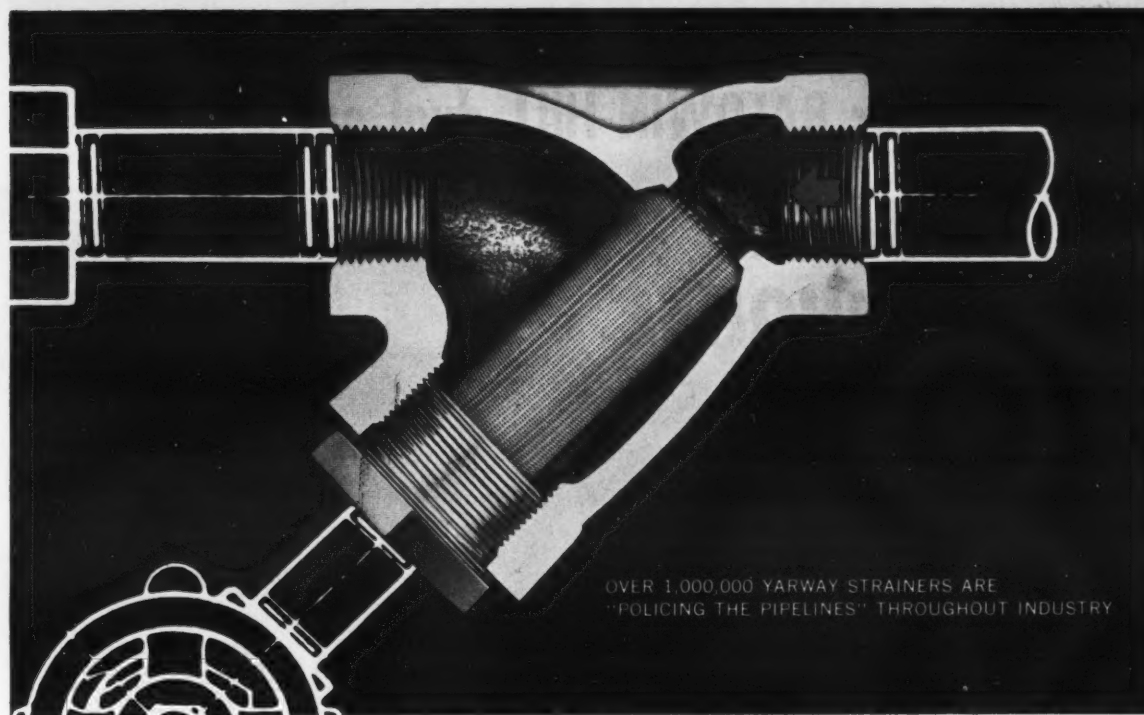
Features: Portable unit is built into aluminum carrying case 18 x 12 x 18" — weighs only 35 pounds.



Tester indicates oxygen and combustibles on separate scales — can be read simultaneously

Description: Oxygen is measured by catalytic combustion, employing disposable container of propane. Results are registered on scale with two ranges — 0-5 and 0-21 percent. Combustibles are measured in separate cell and are indicated on an individual meter, also with two ranges — 0-3 and 1-15 percent. Meters can be read simultaneously.

(Portable tester is manufactured by Instrument Div., Davis Emergency Equipment Co., Dept. CP, 56 Halleck St., Newark, N. J. . . . or for more information check 6647 on form which is located opposite last page.)



OVER 1,000,000 YARWAY STRAINERS ARE "POLICING THE PIPELINES" THROUGHOUT INDUSTRY

it's GOOD ENGINEERING to install YARWAY STRAINERS

It's good pipeline engineering to install strainers that are well-engineered—Yarways.

Yarway Fine Screen Strainers protect equipment, prevent dirt, scale, chips, welding dross, etc. from reaching working parts.

Yarway Strainers feature Dutch weave Monel woven wire screens with high mechanical strength

and extra fine straining service. Perforated screens in Monel, stainless steel or brass are also available for certain services.

Screen is easily removed for cleaning. Unscrew screen cap and screen comes out with it. When replacing screen, straight threads assure correct alignment, no distortion of screen.

Yarway Strainers are made in iron or steel with rust-resistant finish—also in bronze, stainless steel or aluminum. 10 standard sizes from 1/2" to 3". Larger sizes to order. Nearly 300 Industrial Distributors stock and sell Yarway Strainers. For the name of the one nearest you, and Yarway Strainer Bulletin S-204, write

YARNALL-WARING COMPANY

125 Mermaid Avenue, Philadelphia 18, Penna.



YARWAY

FINE SCREEN STRAINERS

When inquiring check 6648 opposite last page

"Inside-out" Furnace Construction calls for BALDWIN-HILL dual purpose

SUPER POWERHOUSE CEMENT

B-H Super Powerhouse Cement applied over B-H Mono-Block on Riley-Stoker Pressurized Furnace at large chemical plant.



it Insulates as it Finishes . . .

- Dries fast to smooth, glazed white finish; may be painted with water or oil-base paints or weather-proofed for outdoor application.
- Does not wash off after initial set if exposed to rain before application of weatherproofing.
- Dries without shrinking; no reworking to point up shrinkage cracks.
- Easily troweled; excellent adhesive qualities prevent fall-off during application.

S See our catalog in Sweet's Plant Engineering File or write for a copy.
BALDWIN-HILL COMPANY
407 Breunig Ave., Trenton 2, N. J.
Huntington, Ind. Kalamazoo, Mich. Temple, Texas



COMPLETE LINE OF BALDWIN-HILL INSULATING PRODUCTS

| | | |
|-----------------|--------------------------------|--------------------------------------|
| B-H Mono-Block | B-H Super Powerhouse Cement | B-H No. 100 Pipe Insulation |
| B-H Blanket | B-H No. 1 Insulating Cement | B-H 85% Magnesia Pipe Insulation |
| B-H Koldboard | B-H No. 52 Asbestos Cement | B-H Calcium Silicate Pipe Insulation |
| B-H Bond-Tite | B-H Spun Felt Insulation | B-H Mono-Kover Pipe Insulation |
| B-H Weatherseal | B-H Fine-Fyber Felt Insulation | B-H Spun Mineral Wool Fill |

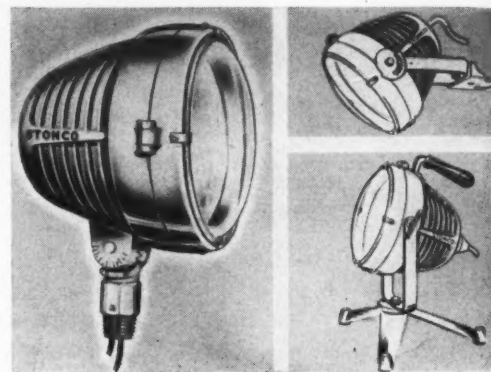
SAFETY

Producing 121,500 candlepower, light has 500 watt rating . . .

unit, designed for permanent mounting, can be used as portable emergency lighting

Uses: For long-range lighting of industrial areas, unit is also equipped with carrying handle, quick-disconnect socket and cord, aluminum tripod for emergency portable lighting.

Features: Floodlight concentrates 121,500 candlepower output into oval-shaped beam . . . is rated at 500 watts.



Light is available with clear or colored lenses

Description: Unit is of cast aluminum construction with internal and external ribs for heat dissipation. Lamp life is stated at 2000 hours — is cradled in rubber cushion-seal, protecting it from shock and abuse. Sealed water-tight by cast aluminum cover ring, light is available with clear or colored lenses.

For critical beam-positioning, unit is equipped with aiming quadrant and arm-locking teeth to fix focus permanently.

(Floodlight is product of Stonco Electric Products Co., Dept. CP, Kenilworth, N. J. . . or for more information check 6650 on form which is located opposite last page.)

A "different"
editorial
philosophy . . .



. . . governs the content, format of CHEMICAL PROCESSING. There are good reasons for this "difference" . . . and also for the fact that you get CP without demand of a formal subscription price. Read what the Editors say about this on page 118.

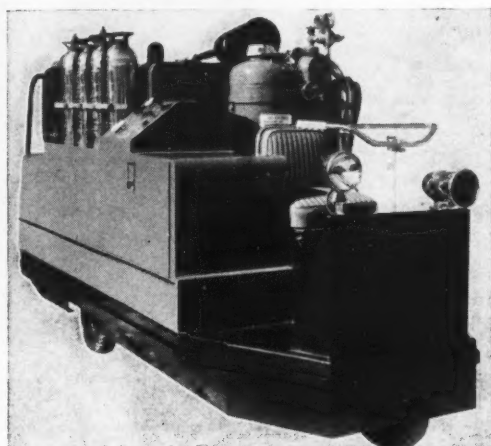
When inquiring check 6649 opposite last page

**Carries dry chemical, CO₂,
water and foam . . .**

unit fills gap between portable fire equipment and municipal-type fire trucks

Uses: In-plant fire apparatus is designed to fill gap between portable fire extinguishers and larger fire trucks.

Features: Truck may be equipped to control fires in various types of operations . . . chemical, plastic, textile, pulp and paper.



Trucks may be equipped to control fires in many kinds of operations . . . chemical, textile, pulp and paper

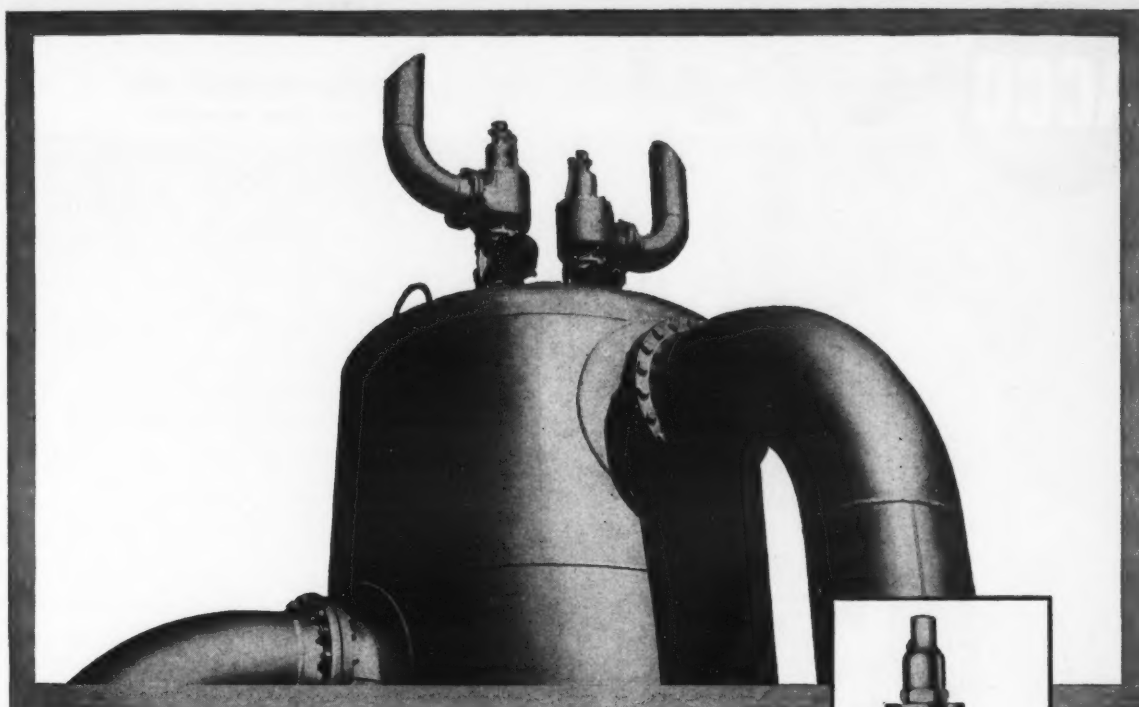
Description: Unit carries dry chemical, CO₂, water and foam for control of most fires. Standard equipment includes 15 cu ft accessory cabinet and cabinet for extension ladder. Also included as standard . . . 100 foot hose for water fog and carbon dioxide. With a speed of 15 mph, truck has turning radius of 96 inches. Unit is 50 inches wide, 68 inches high.

(Model S-556 in-plant fire truck is manufactured by Seco Engineering and Mfg. Div., Seco Safety Products Co., Dept. CP, 1300 Fort St., Detroit 26, Mich. . . . or for more information check 6651 on form opposite last page.)

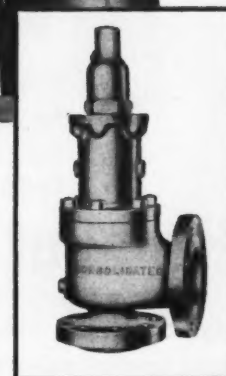
**Workers as well as veterans
are "older than their years"**

"The Question of Chronological vs Physiological Aging in Industry" is a six-page booklet devoted to general aspects of its problem. It is especially concerned with retirement age.

"Aging Question" is issued by Occupational Health Institute, Inc., Dept. CP, 6 E. 39th St., New York 16, N. Y. When inquiring specify 6652 on form opposite last page.



- ★ Economical "2 in 1" Design
- ★ Peak Performance
- ★ Absolute Protection
- ★ Maximum Interchangeability



CONSOLIDATED SAFETY RELIEF VALVES GIVE YOU ALL FOUR — AND MORE

Consolidated Safety Relief Valves satisfy *every* requirement of the most advanced processing facilities. Valve action is *consistently* positive. You get peak performance even where discharge lines are long or there is low "superimposed" back pressure in the relieving system!

The Standard type can be converted to Bellows type *in the field*. Center-to-face dimensions of inlet and outlet are such that you can interchange

these valves with the safety relief valves of other manufacturers. Real flexibility of application that cuts inventory costs! Optically-ground flat seating surface and fewer functional parts than comparable valves contribute greatly to easier, more economical maintenance.

Get top economy and absolute protection with Consolidated Safety Relief Valves. Full range of sizes and pressures available. Write for Catalog 1900 for complete information.



CERTIFIED AND APPROVED. Both Standard and Bellows Valves are approved under API-ASME and ASME Unfired Pressure Vessel Codes and are certified by the National Board of Boiler and Pressure Vessel Inspectors.

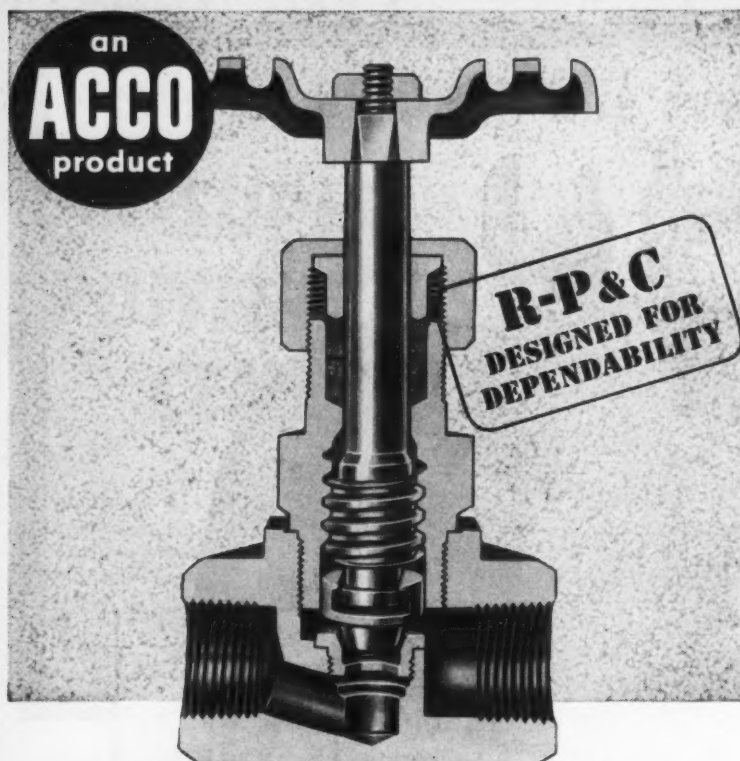
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

CONSOLIDATED SAFETY RELIEF VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** TULSA, OKLAHOMA

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'HANCOCK' VALVES, Watertown, Mass. AIRCRAFT CONTROL PRODUCTS, Danbury & Stratford, Conn. and Inglewood, Calif. 'SHAW-BOX' AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.

When inquiring check 6653 opposite last page



CARBON STEEL

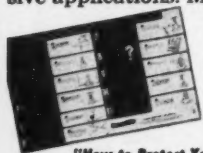
R-P&C Bar Stock Valves

• **RATED FOR 10,000 PSI**

• **FOR CLOSE CONTROL, HIGH TEMPERATURES OR PRESSURES**

These rugged bar stock valves were originally developed by R-P&C for close control or instrument use. However, their versatility has proven itself in so many different applications that they are now considered general purpose valves. They are particularly applicable for services involving throttling, or high temperatures and pressures, and are especially adapted for use in crowded applications such as panel boards.

Rated for 10,000 psi at 150°F., each carbon steel bar stock valve is individually tested at 15,000 psi before leaving the factory. They are supplied in sizes from 1/4" to 1", in globe and angle styles with female ends, male and female ends, or male union ends. They can be furnished in 12-14 chromium stainless steel and 18-8 molybdenum stainless steel for corrosive applications. May also be supplied with special stellite discs for extra abrasion resistance in extremely severe throttling services. Those other than carbon steel are rated at 4,000 psi at 150°F.



**FREE
WALL
CHART**

"How to Protect Your Valves"
17 x 22" wall chart gives installation
and operation pointers. Tells
how to protect valves, prolong
life. Write for your copy.

R-P&C's complete selection of bar stock valves is only one element in a complete valve line which includes gate, globe, angle and check valves in a wide range of sizes and styles, in bronze, iron and cast and forged steel. See your R-P&C Distributor or write for catalog.

ACCO



**R-P&C Valve Division
AMERICAN CHAIN & CABLE**

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit,
Houston, New York, Philadelphia, Pittsburgh, San Francisco,
Bridgeport, Conn.

**R-P&C
valves**

When inquiring check 6654 opposite last page

SAFETY

Outlines use of color for plant protection

Printed in two colors, 12 by 17 inch wall chart contains information on use of color in safety practices for the protection of property and personnel. Sheet describes pipeline identification by color, following recommendations of American Standards Association, and uniform color code for safety, as approved by safety authorities. According to pipeline identification system, materials are assigned to five main classes with colors to identify each class.

"Safety Practices Chart" is issued by The Arco Co., Dept. CP, 7301 Bessemer Ave., Cleveland 27, Ohio. When inquiring specify 6655 on form opposite last page.

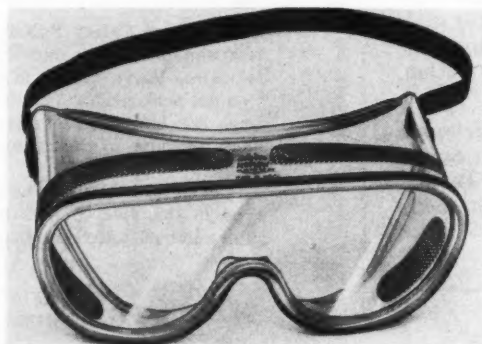
Nickel screen incorporated in plastic protective eyeshield . . .

ventilation eliminates fogging hazard; eyeshield can accommodate ordinary glasses

Uses: Flexible plastic eyeshield is especially valuable where temperature and humidity conditions lead to fogging of conventional eyeguards.

Features: Twenty mesh nickel screen is incorporated in plastic molded eyeshield so that adequate ventilation can stop internal fogging.

Description: Integrally-molded nickel screen and plastic frame give screen-covered open area of more than ten inches for ventilation. Plastic lens



Plastic eyeshield weighs less than two ounces

tilts in towards face (as with personal glasses) permitting greater work area vision without moving head forward.

Workers who wear conventional glasses are not troubled with temple pressure since eyeshield has about 3/8" clearance between its inner surface and corrective eyelenses. Plastic optical lens is resistant to pitting and replaceable without tools.

Flammables

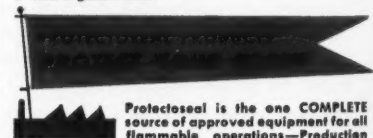
**STORE SAFE
and POUR SAFE**
with this Approved Double-Duty
Safety Container!

PROTECTOSEAL STOR'por Dispenser



combines the functions of a Safety Can with those of a Supply Can to perform both services with one piece of equipment—eliminates cost of an extra can—does away with necessity of using a funnel with its lack of control and possibility of dangerous spillage.

The Protectoseal Stor-Por Dispenser is Underwriters Laboratories and Factory Mutual Laboratories approved. Both fill opening and pouring spout have double perforated metal fire baffles to prevent ignition of contents. Easy-working valve at base of flexible spout is operated by carrying hand and gives positive control while pouring. Available with 1/4" and 3/8" flexible hoses in 1- and 2-gallon sizes, and 3/4", 1" and 1 1/2" flexible hoses or rigid spouts in 3- and 5-gallon sizes.



Protectoseal is the one COMPLETE source of approved equipment for all flammable operations—Production—Storage—Dispensing.

All Protectoseal Fire Preventive Equipment is designed by specialized engineers for time-saving and convenient use, and in most cases actually speeds production.

Send for NEW Flammables Equipment Guide Chart. Illustrates and describes 30 approved Fire Protective Safety Devices and their uses.

Fill in coupon and attach to company letterhead.
West Coast Warehouse:
Los Angeles, Calif.
In Canada: Safety Supply
Co.—Toronto.



THE PROTECTOSEAL COMPANY
1932 S. Western Ave., Chicago 8, Ill.

Without cost or obligation, send "A Guide to Selection and Use of Protectoseal Equipment for the Safe Storage, Handling and Use of Flammables."

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

When inquiring check 6656
opposite last page

CHEMICAL PROCESSING

SAFETY

Entire eyeshield weighs less than 2 ounces.

("Airflow" eyeshield is a development of United States Safety Service Co., Dept. CP, 1215 McGee Street, Kansas City 6, Mo. . . . or for more information check 6657 opposite last page.)

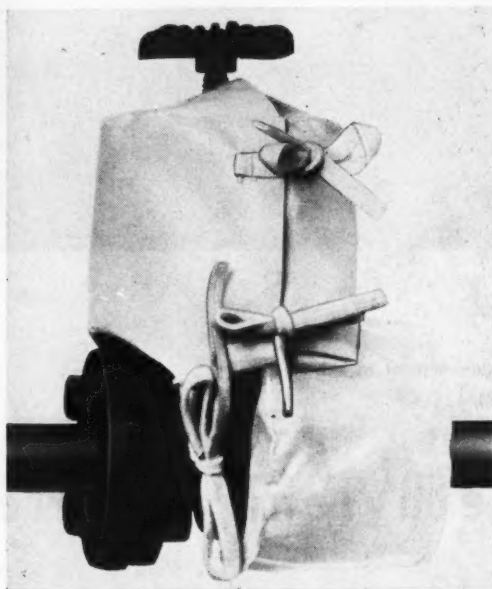
Universal design — eleven cover sizes replace 142 . . .

Covers stop spray from leaky valves, indicate leaks by a vivid color change

Uses: Fabric valve covers are designed to fit valves in sizes from the height of 3" to 25".

Features: Manufacturer reports that eleven sizes of valve covers will fit 90% of standard valves.

Description: Fabric covers are designed to prevent sudden leaks from spraying chemicals over personnel and equipment. Both indicating and



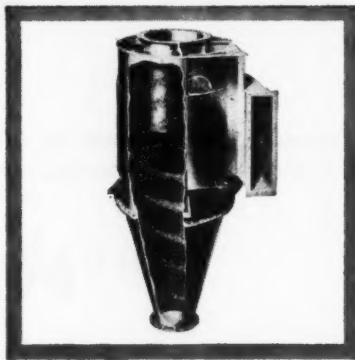
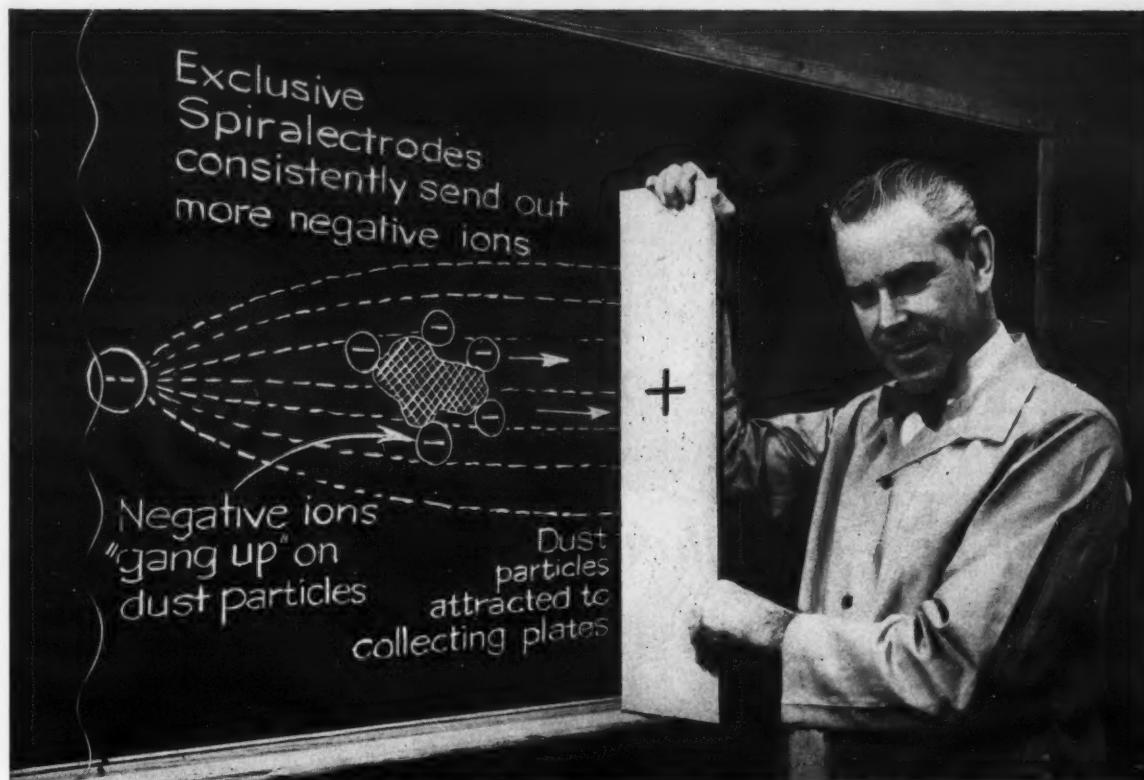
Covers are available in indicating or non-indicating fabric, or Teflon for high-temperature work

non-indicating materials are available. Indicating material gives a quick warning by a vivid color change. Teflon valve covers are also available for high-temperature service.

Sizes range from 3-inch valve height (with circumference up to 12 inches) to 20 to 25 inches of height with circumference up to 50 inches.

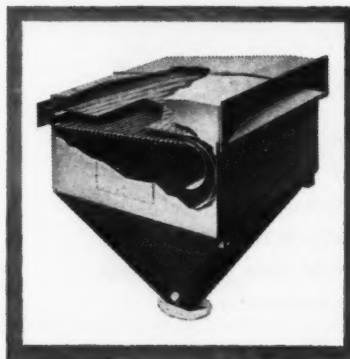
("Spray-Stop" valve covers are a product of Neirad Industries, Inc., Dept. CP, One Post Rd., Darien, Conn. Check 6658 opposite last page.)

How a Buell Collection System "gangs-up" on dust to meet the toughest air pollution codes



Buell Cyclones also deliver extra collection efficiency to "gang-up" on dust: Exclusive Shave-off design harnesses double-eddy current and puts it to work.

With positive gas flow control for peak efficiency . . . plus continuous cycle rapping to eliminate puffing . . . Buell's "SF" Electric Precipitator really "gangs-up" on dust (even dust with high resistivity) to permit full production even under the most rigid anti-air-pollution codes.



Buell's Low Resistance Fly Ash Collector combines high efficiency to meet present day strictness, with low draft loss for natural or mechanical draft installations.



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Write:

Buell Engineering Company
Dept. 11-G, 70 Pine Street
New York 5, New York

buell



Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

When inquiring, check 6659 opposite last page

you can

Soda Ash

ACETAMIDE

Phenol

Alum

CALCIUM
CARBONATE

ABIETIC
ACID

pack

Gallic
Acid

METHYL
CELLULOSE

PEARL MOSS
(IRISH MOSS)

ship

DIMETHYLUREA

INHIBITORS

IRON OXIDE

Adipic
Acid

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Waxes

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RESINS

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and save money doing it!

Chase Multiwall bags give your dry chemicals (effluorescent, deliquescent or anhydrous) *complete* protection—yet, they cost far less than fiber drums, metal containers, or barrels...and they save up to 75% in storage space, too. Available in any combination of plies, with or without liners, tailored to YOUR exact requirements.

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General Offices: 309 W. Jackson Blvd., Chicago 6, Ill.

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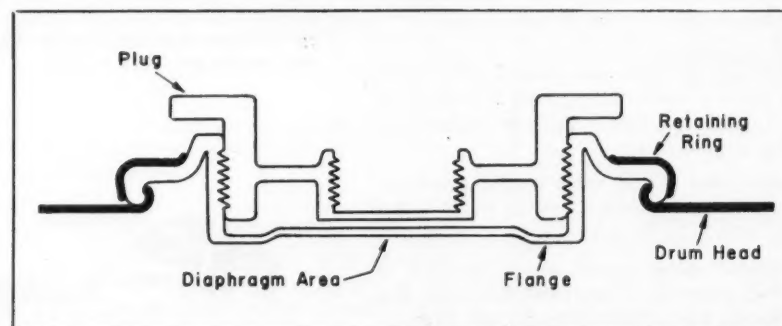
When inquiring check 6660 opposite last page

**packaging
and
shipping**



Eliminating the last possible area for contamination, of its silicone products, Dow Corning at Midland, Mich., is using . . .

polyethylene closures



CHEMICAL PROCESSING



Closure consists of three parts . . . polyethylene flange and plug, and metal retaining ring

res for phenolic-lined drums

Although metal closures for lined drums have, in most cases, been satisfactory, even slight damage to their coating can lead to contamination of particularly sensitive products. Dow Corning ships just such materials — silicone emulsions — and feels that any precaution is justified. Dow has shipped silicone materials in lithographed drums lined with a phenolic compound since 1954 and has recently adopted closures of polyethylene. Closure comes as complete unit and is sealed onto

the drum with one crimping operation. Closure itself consists of three components . . . flange, plug, and retaining ring. Poly flange has diaphragm which covers drum opening until cut out . . . preventing tampering or leakage during shipping. Unit may be satisfactorily resealed, however, by replacing plug after diaphragm is removed.

Dispensing pumps of two-inch size may be screwed directly into the flange. Plug (Please turn to next page)

NEW BAGGING SCALE



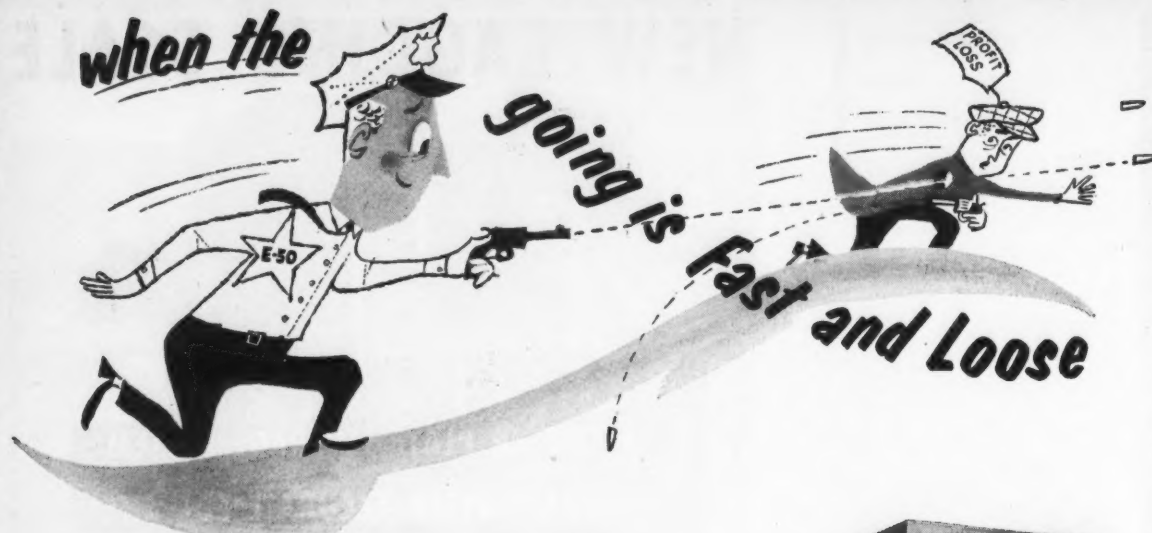
The expanding petro-chemical industry uses more Thayers than any other scale. Thayer Scales are handling polyethylene, polychloride, carbon black, resins, light and dense soda ash. For engineering recommendations please write THAYER SCALE AND ENGINEERING CORPORATION, ROCKLAND, MASS.



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BATCHING • FILLING • CHECKWEIGHING • AUTOMATICALLY

When inquiring check 6661 opposite last page



YOU CAN DEPEND ON THE **Richardson** E-50!

When the weighing is fast and the materials are loose (or even sluggish!), and you're having a running battle with profit loss from weight inaccuracy or the high cost of bagging and scale upkeep . . .

here's one scale that won't let you—or your profits—down!

IT'S DEPENDABLE! The E-50's work-horse dependability makes it the perfect choice for any plant where output vitally depends on the perfection of the bagging scale. And upkeep is low! You'll find Richardson Scales still in operation after 30 and more years of service.

IT'S FAST, ACCURATE! With the rugged, completely automatic Richardson E-50 you'll get high speed bagging with accuracies that never before were a practical possibility—up to 1/10 of 1% under optimum conditions.

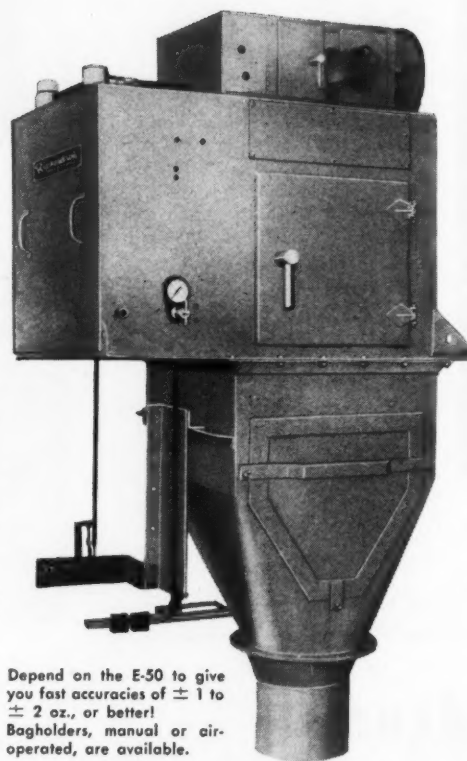
IT'S VERSATILE! Unique design permits the weighing of hundreds of food, chemical, grain and other materials. The E-50 is equally efficient as an independent bagging machine, or as an integral part of a co-ordinated production line packaging system. Don't let weight inaccuracy and bagging costs pick your pockets. Find out about the scale that really unties production tie-ups—Richardson E-50. Write today for free illustrated bulletin #3749A that tells the whole cost-saving E-50 story!

Richardson

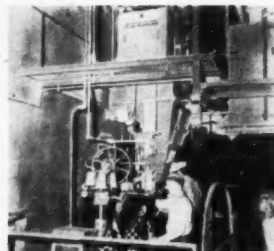
MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY • Clifton, New Jersey

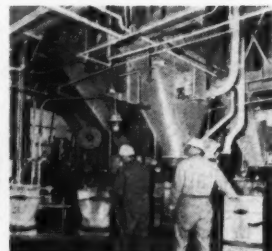
Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit • Houston
Memphis • Minneapolis • New York • Omaha • Philadelphia
Pittsburgh • San Francisco • Wichita • Montreal • Toronto • Havana
Mexico City • San Juan



Depend on the E-50 to give you fast accuracies of ± 1 to ± 2 oz., or better! Bagholders, manual or air-operated, are available.



Duplex Model E-50 bags poultry mash up to twenty-two 50-lb. bags per min. at leading feed mill.



Ten 50-lb. bags per min. of antibiotic are delivered from Duplex E-50 in major pharmaceutical plant.

PACKAGING & SHIPPING

Polyethylene Closures

(Continued from preceding page)

also has diaphragm which may be removed, providing opening for $\frac{3}{4}$ -inch fittings.

The $\frac{3}{8}$ -inch pipe thread vent also is diaphragm sealed, therefore it, too, is leakproof and tamper-proof. Vent plug is fluted to afford venting without complete removal of the plug.

Drums as received from manufacturer will have vent mounted in place. The two-inch opening to receive closure will be sealed with metal dustcover which prevents dirt and moisture entering drum during shipment. Operator need only remove and discard metal seal, fill through opening and crimp complete closure in place . . . and the drum is ready for shipment.

(Polyethylene drum closures and vents are manufactured by Rieke Metal Products Corp., Dept. CP, Auburn, Indiana . . . or for more information check 6663 on form which is located opposite last page.)

Choice of two lengths selected with foot pedal, free hands for handling carton

Uses: Automatic tape dispenser is designed for high production tape sealing of uniform runs of boxes requiring two tape lengths.

Features: Foot control automatically delivers either one of two pre-determined lengths of tape. Random lengths may also be obtained without changing length settings.

Description: Lock at side of the machine is loosened and dual selector levers are set for needed



Foot control provides tape lengths from 6 to 70"

When inquiring check 6662 opposite last page

PACKAGING & SHIPPING

tape lengths. Lock is then tightened* Unit has 43 oz water capacity. Motor, 115 volts AC, runs only when feeding tape.

Heating tank for warm water moistening is standard equipment. Handling standard diameter rolls of paper, cloth, or fiber reinforced tape from 1 to 4" in width, dispenser provides lengths from 6 to 70".

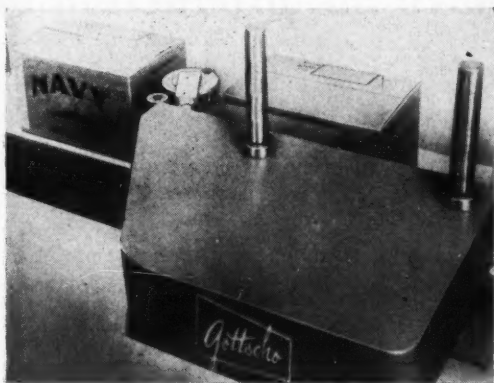
("88" dual length tape dispenser is product of Nashua Corporation, Dept. CP, Nashua, N. H. . . . or for more information reader may simply check 6664 on the convenient Reader Service slip which is located opposite last page.)

Imprints code dates, lot numbers on ends of shipping cartons without removal from line . . .

unit marks two different panels of box without interrupting normal flow

Uses: Attachment simultaneously marks both rear and side panel of shipping cases without turning or removal from conveyor line.

Features: Machine operates on all cases with a minimum length of 7", regardless of flow regularity. Line spacing of only 10" need be maintained.

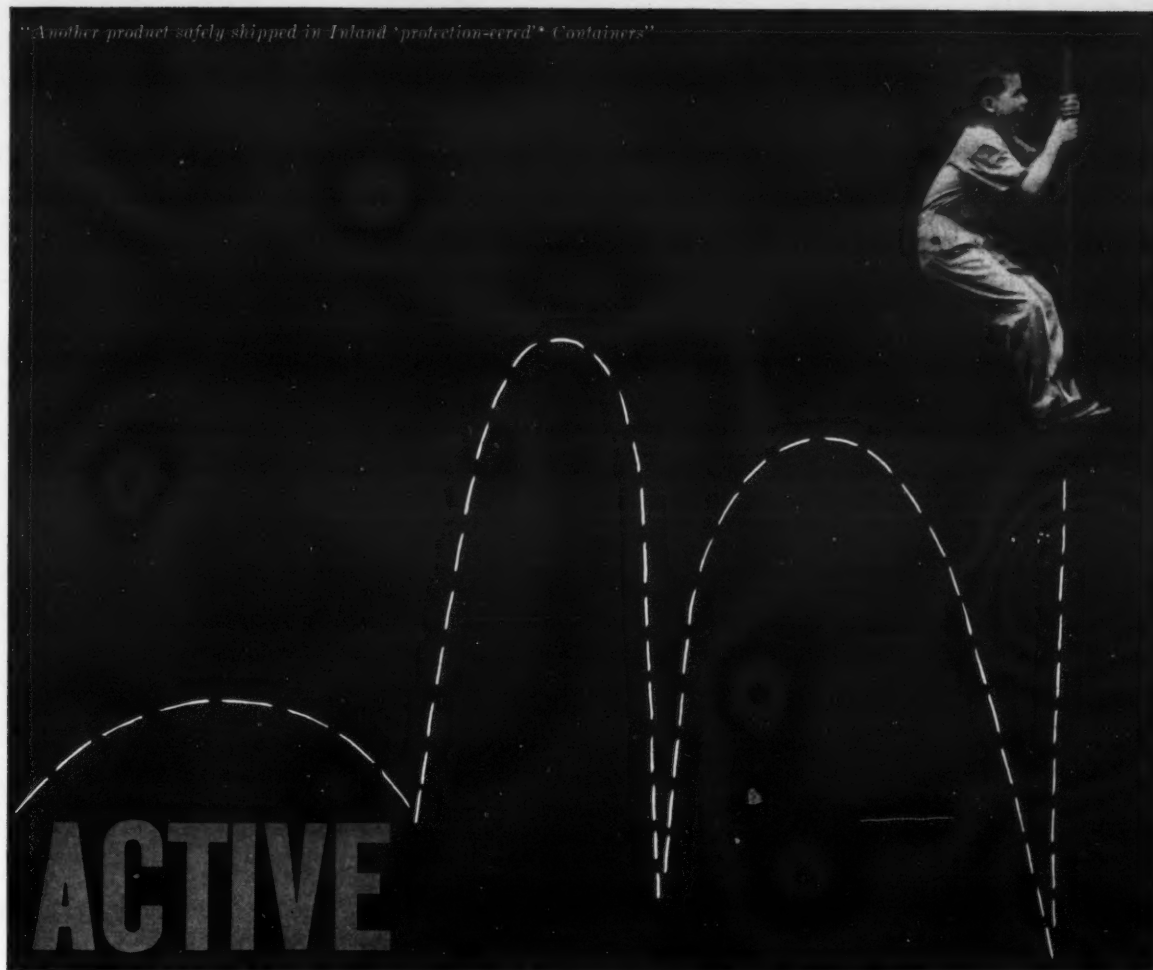


Conveyor spacing of only 10" between cartons need be maintained

Description: Micro-switches connected to solenoid assure positive marking action. Markings may be located on case between 1 and 15" from its bottom. Unit accepts up to eleven letters or figures, depending on their size, on a single line up to 2" long. Marker uses changeable rubber type.

("201 Rolacoder" is manufactured by Adolph Gottscho, Inc., Dept. CP, Hillside 5, N. J. . . . or for more information reader may simply check 6665 on the convenient Reader Service slip which is located opposite last page.)

"Another product safely shipped in Inland 'protection-cered' Containers"



is the word for **LITHIUM**

It's the lightest metal known.

Put a piece of it on your windowsill and it will soon dissolve into thin air.

Combine it with chemicals and it will do a thousand and one miraculous jobs from purifying the air in a submarine to making glass and ceramics.

Try to package it and you've got yourself a problem.

A few years ago the Lithium Corporation of America, Inc. asked our container specialists for help in packaging their lithium bromide and other compounds. There was no past experience to draw from in this case; because

lithium itself was so new, very little was known about it. Test followed test in our laboratories, and at last a steel container with a special baked-on lining was developed that could successfully hold these young and restless chemicals and keep them fully protected from contamination or loss of quality in shipment.

NOW . . . ABOUT YOU. Whether your product is brand new or well-established, packaging precision is all-important. Chances are that steel packaging by Inland can give you just what you need. For the full story, write Bob Boecher, Dept. 311C



*the right container, with the right lining for your product

Full line of steel and stainless steel shipping containers including galvanized and heavy duty ICC drums.

INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company • 6532 South Menard Avenue, Chicago 38, Ill. • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio.

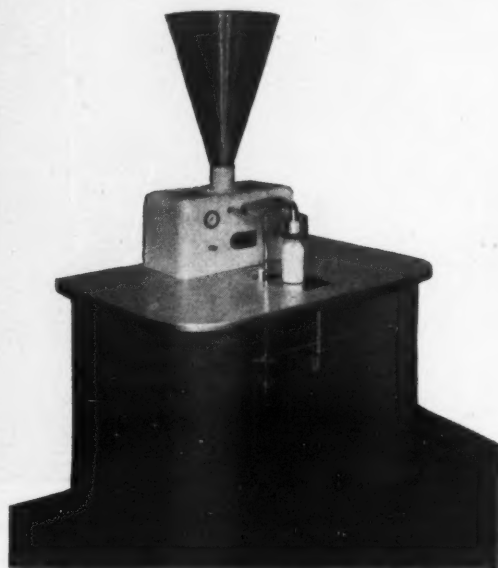
When inquiring check 6666 opposite last page

Switches filling action to match product

Uses: Filler is designed for rigid or non-rigid containers and can handle most free-flowing as well as non-free-flowing powders.

Features: For collapsible containers, shrouding is used to permit air to evacuate from both container and surrounding space — equalizing pressure and avoiding distortion of container.

Description: Standard model fills containers ranging up to $3\frac{1}{2}$ " diameter by 6" high with 70 mm opening. Operation is controlled by electric



Full changeover, including replacement of filling head and shroud, is accomplished in under ten minutes

timing devices and solenoid valves, minimizing mechanical operating parts. Filling cycle may be easily changed from alternating vacuum pulses to non-alternating system.

Unit is equipped with $1\frac{1}{3}$ -hp vacuum-pump motor. As container size is not governed by machine's capacity, but rather by size of vacuum pump, optional 1-hp vacuum pump would increase capacity to containers $6\frac{1}{8}$ " diameter by $7\frac{1}{4}$ " high. Each filling cycle is completely automatic and constant, repeating itself exactly when attendant applies pressure to actuating pedal. All contact parts may be removed for cleaning. Hopper and major portion of filling head are stainless steel. Connecting lines are of neoprene or other special materials. Full changeover, including replacement of filling head and shroud, is made in less than ten minutes.

(Vacuflo Junior is manufactured by Pneumatic Scale Corp., Ltd., Dept. CP, 68 Neponset Ave., Quincy 71, Mass. Check 6667 opposite last page.)



This is CONTINENTAL'S new *dedicated to the production of*

The product of the handsome building pictured here will be more rapid improvement of cans and packaging methods, for the immediate benefit of Continental customers.

This is the new multi-million-dollar research and development center of Continental's Metal Division, located in Chicago. It brings together under one roof 265 creative-minded scientists and engineers. With as many more technicians and assistants, they function as a closely knit team—in developing better materials, processes and machines—and in taking a fresh, new look at package design.

At their disposal are the most modern chemical, physical and engineering laboratories. Also contained in the 260,000 square feet of the center are complete pilot-plant facilities for checking out any individual proposal against considerations of cost, adaptability to present equipment, and good production practices.

Backing up the new center are other Metal Division laboratories at New York and Hayward, Calif., the Central Research and Development Division facilities in Chicago, which handle long-range experimental work, and 18 field laboratories across the nation.

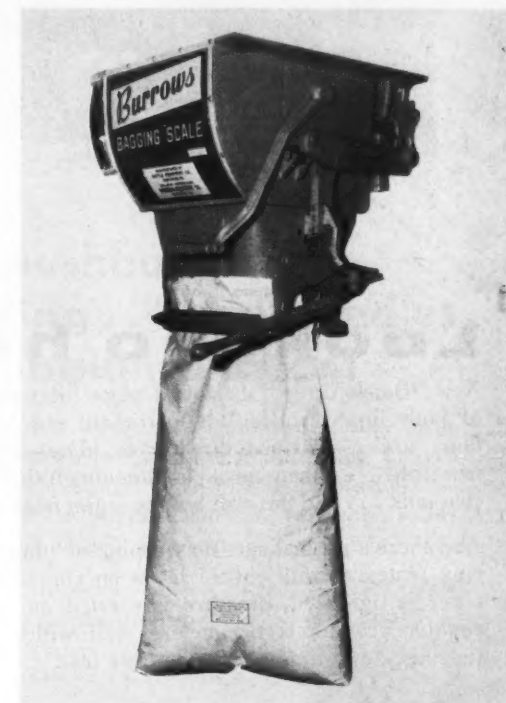
**No loose weights used
in hand-operated
bagging scale . . .**

will fill six to eight bags a minute with accurate weights to 160 pounds per bag

Uses: Fills paper, cotton, or burlap bags to predetermined weight up to 160 pounds.

Features: Calibrated weigh beam and attached poise eliminate loose weights.

Description: Designed for free flowing materials, hand-operated bagging scale attaches to any



Scale mounts in 18-inch square area

eighteen inch square or surge hopper. Clamp is designed to handle paper, cotton, or burlap bags. Two fiber brushes in front and back of clamshell gate assure tight seal without leakage.

Scale is constructed of aluminum castings and weighs 95 pounds. Overall height is 17". Weigh beam with attached poise is housed beneath top flange at rear of scale. Over-and-under weight indicator shows 0 to 4 lb underweight with 1/4-lb divisions and 0 to 2 lb overweight with 1/4-lb divisions. Sensitivity is $\pm 1/4$ -lb. Hopper connection plate size is 16 x 16".

(Model 700 Bagging Scale is a product of Burrows Equipment Co., Dept. CP, 1316 Sherman Ave., Evanston, Ill. . . . or for more information reader may simply check 6669 on the convenient Reader Service slip which is located opposite last page.)

w of

research and development center

better cans and packaging methods



*To our friends in the
CHEMICAL INDUSTRY...
our doors and facilities are
always open to you*

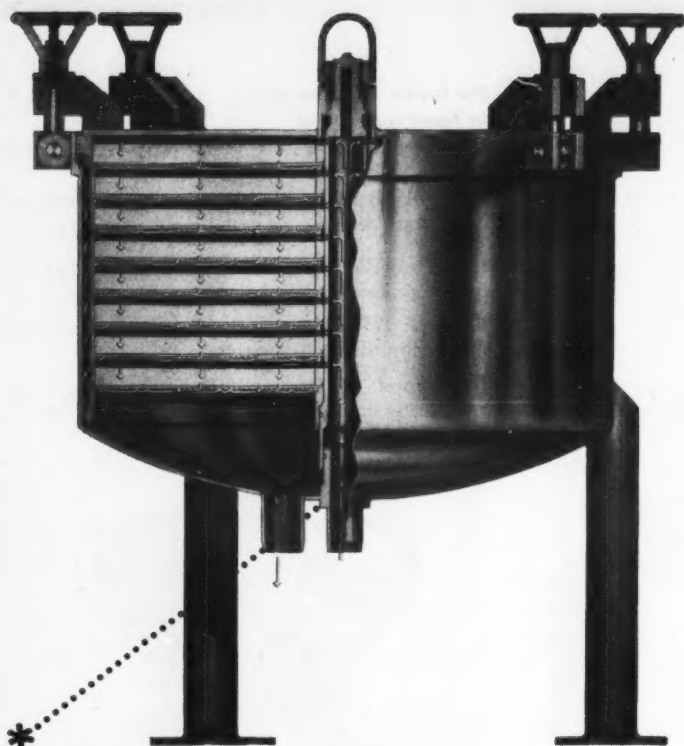
New developments in chemical containers will come from Continental faster than ever, now that our new Metal Division research and development center is working for you. Expect more ideas like our Perma-Lining for steel containers—hot sprayed and baked in the finished container to cover every square inch of inside surface . . . also our liquid detergent cans—12-, 22- and 32-oz. with dripless 1/2-in. polyethylene nozzle, and 16- and 32-oz. with 3/4-in. nozzle.



CONTINENTAL © CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

When inquiring check 6668 opposite last page



* Look, no heel!

New "Batch-Miser" horizontal plate filter recovers 100% of both liquid and solids — without scavenging. Slurry flows under pressure directly to plates from a central manifold . . . then through filter medium. Filtrate flows into tank . . . and through bottom outlet near center of tank.

And there's no leakage, no warping of plates. A pressure ring (integral with cover) bears on rim of top plate. As cover is tightened, pressure is exerted on plate assembly *equally* around its perimeter. And without troublesome tie rods, down-time is considerably less.

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American Machine and Metals, Inc.
Dept. CP-756, EAST MOLINE, ILLINOIS

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- ☐ Send Bulletin with complete data on the new Niagara "Batch-Miser" Horizontal Plate Filter for handling
☐ Send details on renting a pilot model.

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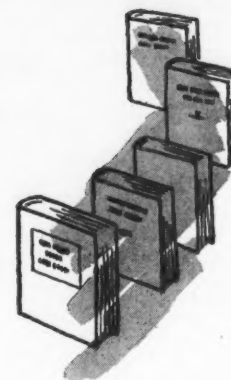
ZONE

STATE

Specialists in Liquid-Solids Separation

When inquiring check 6670 opposite last page

Recent Books



Production of Heavy Water

Reviewed by HILTON A. SMITH
Professor of Chemistry
University of Tennessee

This 385-page volume, edited by George M. Murphy, is divided into two parts. Part I, by James O. Maloney, George F. Quinn, and Harold S. Ray, consists of five chapters describing commercial processes for the production of heavy water and is the "Maloney-Ray report" originally written about ten years ago. The catalytic-exchange-electrolytic process and the water distillation process, both of which were successfully operated during the war, are described in detail. Design and construction of facilities, operating conditions, and production figures are given. Hydrogen distillation method of separation is also described, as well as some miscellaneous processes.

Part II, by Maxwell L. Eidinoff, George G. Joris, Ellison Taylor, Hugh S. Taylor, and Harold C. Urey, describes laboratory studies for separation of hydrogen isotopes. Fundamental experiments for water distillation, catalytic exchange, and dual-temperature processes for three systems are described. Five appendices give operating data and illustrative calculations for these separation methods.

Book is well-written and well-organized. Not only does it contain valuable information for persons interested in isotope separation, but it is a very interesting record of the concentrated effort of a sizeable team of scientists to achieve the successful production of considerable quantities of heavy water.

To obtain "Production of Heavy Water" remit \$5.25 direct to McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y.

Spontaneous Ignition of Liquid Fuels

Reviewed by DR. BERNARD LEWIS
Combustion and Explosives Research, Inc.

This volume of 117 pages is one of a series of monographs called Agardographs, which reflects the name of the issuing organization AGARD, (Advisory Group for Aeronautics Research and Development), affiliated with NATO. It is concerned with the present status of knowledge in the field of spontaneous ignition of liquid fuels. The author, B. P. Mullins, who is a member of the National Gas Turbine Establishment of the Ministry of Supply of Great Britain, is well-fitted to write on the subject since he has actively engaged in this field for a number of years.

The subject of ignition is a very complex phenomenon particularly when considering liquid fuels. Consequently, great reliance must be placed on the results of experiment. Often the experimental method is difficult to design to a sufficiently definitive stage to provide meaningful information that can be correlated with theory.

The author devotes a few pages to some of the elements of kinetics needed to consider the problem of ignition. Some dozen methods are described for the determination of ignition temperature. This is done more or less critically. A valuable list of ignition temperatures of a wide variety of substances is tabulated. The effect of additives, such as lead tetraethyl, organic nitrites and nitrates, and many metals, is described. The effects of surface, pressure, fuel concentration, oxygen concentration, and water vapor on ignition temperatures are discussed. Finally, there are references to a number of applications, notably, static fire hazards, spark-ignition and compression-ignition en-

reviews of current technical and reference work
... summarized for you by authorities
in the field working with the CP staff

gines, gas turbines, and rocket motor and pulse-jet engines.

Extensive references are provided which should be valuable for background.

To obtain "Spontaneous Ignition of Liquid Fuels" remit \$2.75 direct to Interscience Publishers, Dept. CP, 250 Fifth Ave., New York 1, N. Y. When inquiring specify 6671 on form opposite last page.

Organic Syntheses, Volume 35

Reviewed by ROBERT C. KRUG
Associate Professor of Chemistry
Virginia Polytechnic Institute

"Organic Syntheses, Volume 35" (vi + 122 pages), edited by T. L. Cairns, includes thirty-six procedures for preparation of organic compounds. Syntheses are diversified and procedures well-written. Among preparations described in this volume are those for three pyrimidines, three steroids, and several sulfur-containing compounds including methyl 2-thienyl sulfide, para-toluenesulfonyl chloride, thiobenzophenone, and guanylthiourea. Also included in volume is the preparation of hexamethylbenzene. Several esters are described as well as such compounds as β -methyl- γ -valerolactone, 1-tetralone, and 1-methyl-3-phenyl-indane.

In two instances the submitters of preparations have given additional information concerning 1) effect of catalyst concentration on yield; 2) extension of a given synthesis, citing products and yields.

Cumulative index covers volumes 30-35.

To obtain "Organic Synthesis, Vol. 35" remit \$3.75 direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify 6672 on form opposite last page.

Qualitative Organic Analysis and Scientific Method

Reviewed by DR. D. A. SHIRLEY
University of Tennessee

Purpose of this 155-page book is to present "a simpler scheme for teaching qualitative analysis to junior students." The author, Alexander McGookin, who is at the University of Liverpool, attempts to stress the use of scientific method throughout the book, noting that this consists of three basic steps: 1) experiment, 2) observation, and 3) inference. After a short introductory chapter he proceeds to present the material in accordance with the above outline. There are three chapters on experiment, one on observation, and one on inference. The last two chapters are on preparation of identification compounds and general properties of organic compounds.

The reviewer feels that the beginning student would find it difficult with this book to apply scientific method to the problem of identifying an unknown compound. The orderly and logical methods of identification used by Kamm and Shriner and Fuson seem far better to exemplify the application of scientific method.

A unique feature of the book is its frequent use, in footnotes, of anecdotes, semantic discussions, alchemical history, homespun philosophy, and numerous quotations from A. Conan Doyle. While we would scarcely look for a story about an Englishman and a Scotsman on a train journey through Scotland (p. 76) in a book on qualitative organic analysis, the story is a good one.

To obtain "Qualitative Organic Analysis and Scientific Method" remit \$4.50 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

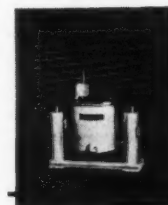
NEW centrifugal



has pushbutton
unloading... and handles
out-of-balance loads!

Now Tolhurst has combined bottom discharge with Center-Slung® suspension. Complete unloading is controlled by a single knob. So the new Batch-Master Centrifugal saves unloading time and runs smoothly, safely — with vibration largely eliminated.

FREE BULLETIN illustrates how Center-Slung Centrifugals handle 3 to 4 times greater out-of-balance loads than ordinary machines. Send for your copy now.



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DEPT. CPT-756, EAST MOLINE, ILLINOIS

- ☐ Send free Bulletin TC-14-55 on new Batch-Master.
☐ Have a representative call.

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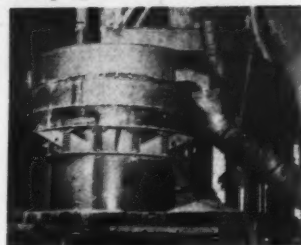
When inquiring check 6673 opposite last page

SCREENING NEWS

Colgate Puts 6 Tons/Hr. of FAB and VEL thru a 48" SWECO

Colgate-Palmolive, S. A., Mexico, D. F., the largest producer of detergents in Central America, now screens upwards of 6 tons per hour of FAB and VEL with a 48" dia. SWECO. The material is conveyed directly to a special feeder over the center of the SWECO Separator. Oversize and lump (plus 8 mesh) materials are returned to processing for 100 per cent recovery, while minus 10 mesh product is conveyed to the Packing Department.

Production Control reports improved uniformity, throughput beyond anticipated capacity, and a sharp drop in maintenance costs. Customer comment: "... results are highly satisfactory."



COLGATE DETERGENT SCREENING operation in Mexico City Plant. Plus 8 mesh material is reprocessed; minus 10 is packaged.

SWECO Eliminates Screen Blinding— Cleans Catalyst Pellets for Filtrol

Filtrol Corporation, Salt Lake City, Utah, had been using a conventional rectangular shaker screen to remove "fines" from extruded catalyst pellets. Maintenance was high due to screen blinding and the difficulty of cleaning the equipment.

The Company now obtains high capacity output from its 48" dia. SWECO Vibrating Screen Separator. The Separator cleans all "fines" from finished TCC grade pellets without blinding.



FILTROL'S CATALYST CLEANING SWECO can be lightly mounted "upstairs." There is no imparted vibration to substructure.

Free screening analysis and recommendations . . .

Your nearby SWECO District Engineer is available to help you with special screening problems. His know-how covers 241 different materials . . . wet or dry, coarse or fine, heavy or light.

SEND FOR DATA FILE 65-3

Detailed information on high-efficiency, low-cost applications of SWECO Screen Separators.



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4800 Santa Fe Ave., Los Angeles 58
LUdlow 3-6262—Cable: SWECOLA

Engineers and Constructors . . . Manufacturers

When inquiring check 6674 opposite last page

processing equipment



Dryer rotates at one rpm, dries 1500-lb batch in four hours

Drying take too long in your process? Perhaps switching to a conical vacuum dryer is the answer. Eastman Kodak did it in their Elon process and . . .

CUT DRYING TIME 75%

TED F. MEINHOLD, Assistant Editor

With **LEWIS J. BEHRNDT**, Elon Department Head, Photochemicals Division, Kodak Park Works, Eastman Kodak Company

Problem: A more efficient way of drying crystallized paramethylaminophenolsulfate ("Elon" photographic developer) was sought by Eastman Kodak Company for their new plant in Rochester, New York. Although the conventional tray dryer used in the old plant had given fairly satisfactory results, it was slow — taking 12-14 hours to dry a batch. Loading and unloading the dryer's 66 trays took an additional 6 or 7 hours. Furthermore, because of the excessive amount of handling involved, there was always the danger of contamination.

Solution: When the new plant was built, engineers selected a double-cone vacuum dryer for this particular operation. Consisting of a cylindrical center section with double-ended cones, the

dryer is completely jacketed. Steam is employed as the medium of heat transfer. Operated by a 3-hp adjustable-speed motor, the dryer operates under 26" vacuum and at 210°F. Vacuum is provided by means of an ejector system.

Dryer is constructed of stainless steel, unit's interior being highly polished. Inside diameter across middle section is 5'8". A 16" quick opening manhole is provided for charging material into dryer. Unit is charged from floor above. Dryer is also fitted with 8" handwheel-operated discharge valve. Actuated by a worm-gear drive, valve has a swing-type plate, firmly seated to assure vacuum-tight seal.

Speed of dryer for drying Elon is about 1 rpm. Tumbling action results in gentle and thorough intermixing of the entire batch and brings every particle into direct contact with the heated surface. Drying is speeded because new surface areas are continually being exposed from which evaporation can occur. Heat is transferred rapidly by conduc-



Unit is charged from floor above

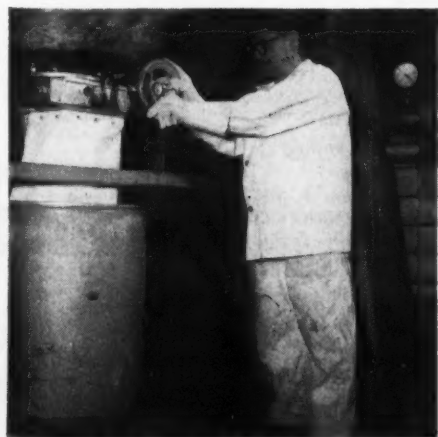
tion, resulting in uniform temperature being maintained throughout the batch, and eliminating danger of jacket temperature exceeding critical temperature of the material being dried.

Results: Unit dries 1500 lb material in only four hours, as compared to 12-14 hours required by old method. Loading and unloading take an additional 1½ hours — instead of 6-7 hours formerly needed. Total drying time per batch, therefore, has been cut by 75%.

Crystals are pure white and dust-free. There is no caking or abrasion of crystal structure. Product is free-flowing, uniform, and has minimum moisture content. Possibility of contamination due to excessive handling has been eliminated.

Cleaning the dryer is a simple operation, since it has smooth polished interior. A quick rinse with hose is all that is necessary. Maintenance on unit has been negligible.

(Conaform vacuum dryers are product of The Patterson Foundry and Machine Company, Dept. CP, East Liverpool, Ohio . . . or for more information check 6675 on form opposite last page.)



Product is discharged through 8" discharge valve into 225-lb drums

40 TO 400 MESH OUTPUT UPPED AS MUCH AS 300%



**ENGINEERING
AIR SEPARATORS
TO SPECIFICATION**
... comes naturally to Sturtevant engineers. They have a tradition of success in developing dry-processing equipment and plants for more than 75 years — from the first rock emery mills to the most modern fluid jet micron-grinding equipment. If your problems include any of the processes listed in the coupon, it will pay you to investigate.

WHAT CAN A STURTEVANT AIR SEPARATOR DO IN YOUR PULVERIZING SYSTEM?

In the cement industry, Sturtevant Air Separators have a tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% — when used in closed circuit with grinding mills. Maybe they can do as well for you.

Easily adaptable to your materials. Sizes of Sturtevant Air Separators range from 3 to 18 feet in diameter. They deliver fines from 40 to 400

mesh at rates as high as 100 tons per hour.

Designed to cut costs! Sturtevant Air Separators are built for a lifetime of low-downtime service. Rugged construction plus easy accessibility for quick maintenance (typified by the "OPEN-DOOR" design in other Sturtevant equipment) assures more output per machine-year. Check the coupon for more information.

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to lower operating costs over more years

CRUSHERS • GRINDERS • MICRON GRINDERS • SEPARATORS
BLENTERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are: _____
Desired capacity is: _____
Name _____ Title _____
Firm _____
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☐ Please send me your bulletin on Air Separators
Also bulletins on machines for:
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STURTEVANT MILL COMPANY, 119 Clayton Street, Boston 22, Mass.

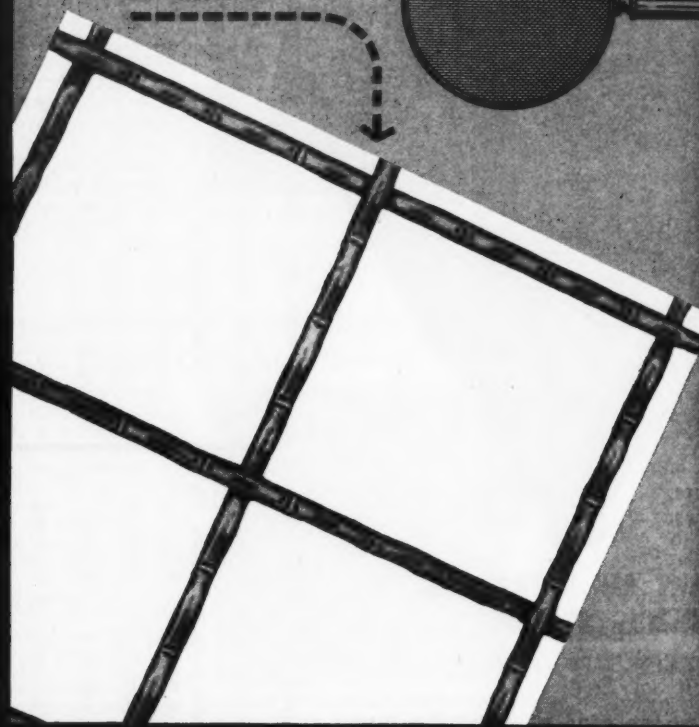
When inquiring check 6676 opposite last page

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with mesh openings

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in any metal or alloy
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LET US FILL your next order for wire cloth in any mesh or weave. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in your classified telephone book. OR, WRITE DIRECT for FREE 80-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

When inquiring check 6677 opposite last page

PROCESSING

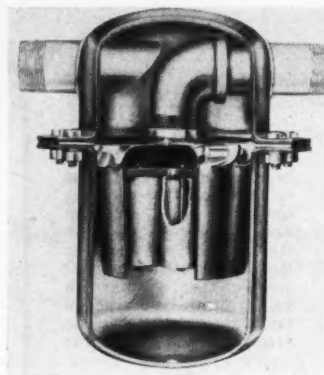
**Porous bronze filters
remove particles
to 6.5 microns . . .**

provide efficient filtration with low pressure drop

Uses: Filtering various liquids and gases.

Features: Permanent porous bronze filters provide efficient filtration with low pressure drop. Units remove solids from 80 microns down to 6.5 microns.

Description: Filters are available in various sizes capable of handling many flow rates. Filtering area is dependent on number of porous bronze elements mounted in unit. Elements measure about



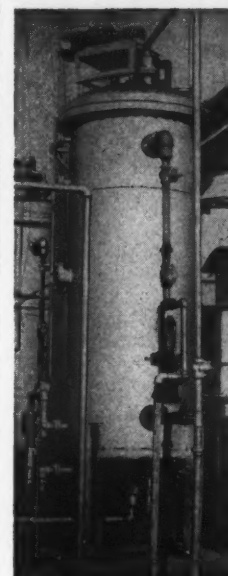
Filter has permanent porous bronze filter elements

four inches long and two and one half inches in diameter. Units are easily cleaned by back washing. Two-inch (pipe size) model with five elements can handle about 200 gpm.

(High Flow filters are product of Arrow Tools, Inc., Dept. CP, 1904 S. Kostner Avenue, Chicago 23, Ill. . . . or for more information check 6678 opposite last page.)

Your guide . . . to more processing ideas and equipment is the alphabetical product directory beginning on page 202

Efficient/Practical SOLVENT EXTRACTION AT LOW COST



The York-Scheibel multi-stage extraction column is ideal for simple counter-current extraction; and for fractional liquid extraction in which the feed material is simultaneously contacted by two selective and immiscible solvents.

Check these features . . .

- POSITIVE MIXING
- POSITIVE PHASE SEPARATION
- SINGLE, COMPACT COLUMN
- HIGH THROUGHPUT CAPACITY
- HIGH EFFICIENCY
- LOW STAGE HEIGHT
- LOW COST PER STAGE.

YORK

YORK PROCESS EQUIPMENT CORP.

4 Central Avenue
WEST ORANGE, N. J.

Complete illustrated catalog available describing laboratory, pilot plant and large scale extraction columns.

When inquiring check 6679 opposite last page



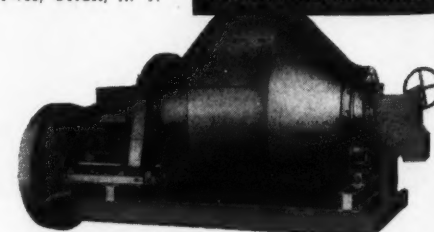
**-WAY
ACTION**

...for
**better,
faster
blending**

It lifts . . . blends . . . mixes . . . seven ways, assuring faster, more accurate blending of dry ingredients. Empties completely. Will not grind or reduce particles. Ideal for blending of fertilizers, insecticides, fibrous materials, pharmaceuticals, atomic materials, chemicals, and a wide variety of other ingredients. Can be fitted with internal liquid spray pipe. Gravity intake and discharge with no internal bearings for free-flowing materials.

For details write to:
MUNSON MILL MACHINERY CO.
Dept. P-756, UTICA, N. Y.

MUNSON
ROTARY BATCH MIXER



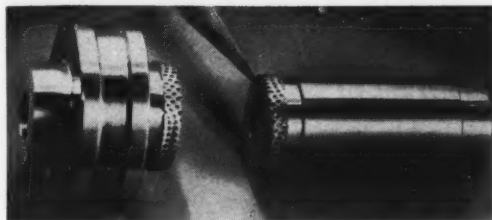
When inquiring check 6680 opposite last page

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

Replaceable valve caps on homogenizer save plug, seat regrinding . . .

provide high-speed shearing action to cut fat globules down to equal size

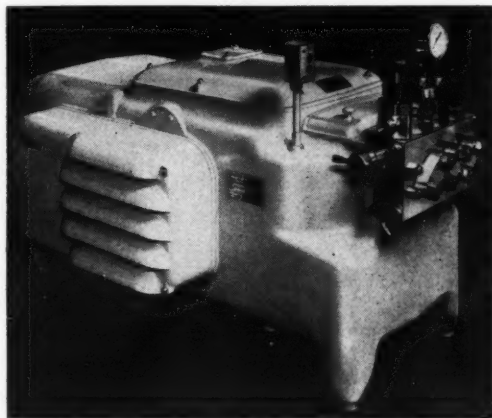


Pencil points to replaceable valve cap, which absorbs 98 percent of valve on homogenizers

Uses: Homogenizing oil emulsions, paper and textile sizings, pastes, waxes, and similar preparations.

Features: High-speed shearing action of perforated replaceable valve caps cuts fat globules down to equal size, assures even dispersion. The caps absorb 98 percent of valve wear, save plug and seat regrinding.

Description: Homogenizers are designed to cover wide range of capacities. There are eight models in the series—smallest handling 50-200



Homogenizer capacities range from 50 to 3000 gph

gph, largest 1750-3000 gph. Units feature heavy-duty construction throughout. All product contact surfaces are stainless steel. Valve plug and seat are made of corrosion-resistant Stellite. Valve parts are interchangeable and reversible. Valve springs are also made of stainless steel.

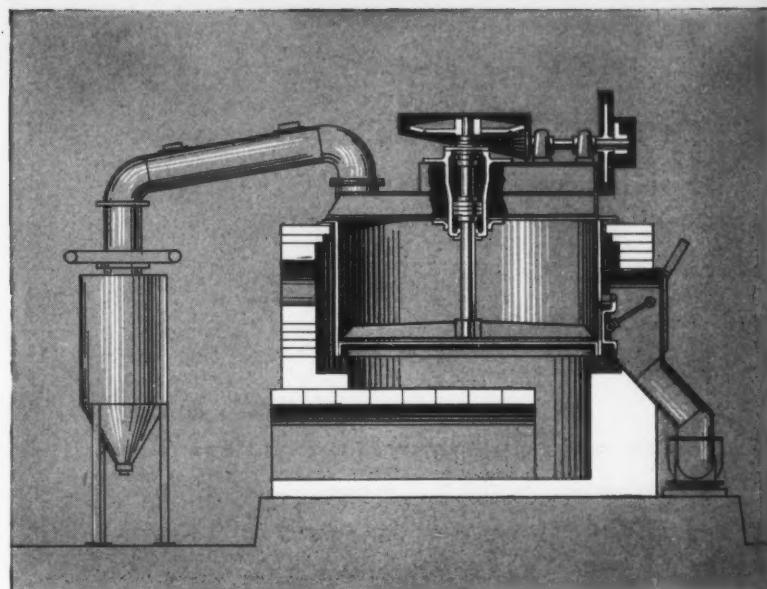
(Stellar series Superhomo homogenizers are product of Cherry-Burrell Corporation, Dept. CP, 427 W. Randolph Street, Chicago 6, Illinois . . . or for more information reader may simply check 6681 on the convenient Reader Service slip which is located opposite last page.)

UNDER FIRED DRYERS

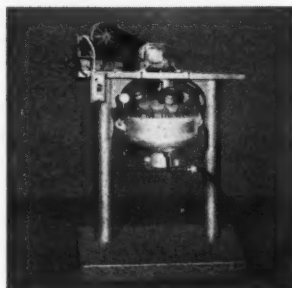
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PROCESSING URANIUM PRECIPITATES

and a wide variety of other materials



Special Steam Jacketed Batch Dryer Showing Dust-tight Discharge Housing and Condenser.



Steam Jacketed Pot-type Dryer Fitted with Rotary Sweep.

Oil or gas fired, these batch type dryers are suited for processing at 700° F, or other temperatures beyond the range of steam,—also when steam is not available. Mild steel, stainless or alloy construction. The material is loaded through the top. A sweep agitates the charge to assure thorough, uniform processing, and discharges the material through the side door—and a dust-tight discharge housing if desired—to a screw or other type conveyor. Exhaust gases are drawn off through the top and can be passed through a condenser to reclaim the fines.

Let our heat engineering specialists, with their wide and successful experience in continuous and batch processing, work with you on your next project. We can handle all phases of the problem including complete materials handling, storage and dust collection. This assures fixed unit responsibility; the smooth synchronized operation of all parts of the installation; and utmost economy and satisfaction.

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FABRICATORS

ERECTORS

DRYERS • COOLERS • CALCINERS • KILNS — Complete Facilities Including Materials Handling

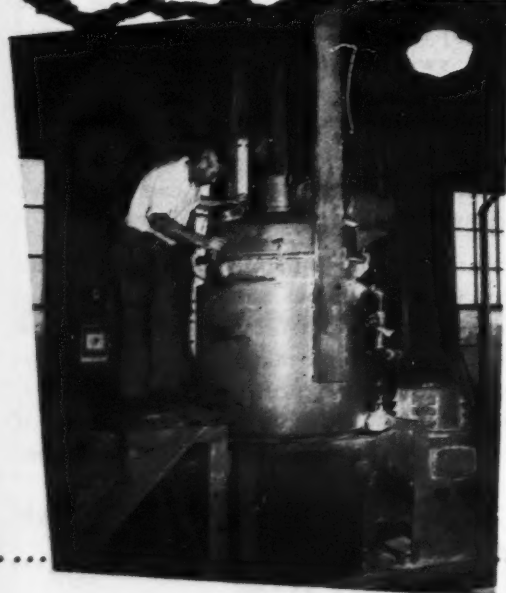
When inquiring check 6682 opposite last page

"With our
Abbe Dispersall Mixer
we have reduced our
labor cost and get
a much finer paste"

We are using our Abbe Dispersall Mixer in the manufacture of heavy pastes, and find that we have reduced our labor cost and get a faster mix by using this piece of equipment over the old type of equipment which we were using. In the old mixers we could mix only 300 lbs. at a batch, whereas with the Abbe Mixer we can mix 900 lbs. at a batch.

We purchased this piece of equipment complete with vacuum pump, and we find that we get a very much finer paste due to the fact that mixing under vacuum, we do not mix in a lot of air bubbles.

Yours very truly,
COMPANY



Abbé Dispersall
Mixer in the
manufacture of
heavy pastes
mentioned above.

ABBÉ ENGINEERING COMPANY

50 Church Street • New York 7, N. Y.

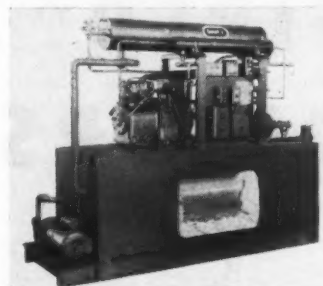
Address Department 46

When inquiring check 6683 opposite last page

PROCESSING

**Packaged water chillers
feature all-copper
water passages**

New line of packaged water chillers finds use in wide variety of industrial applications — wherever pure water is used. Units feature all-copper or brass water passages, eliminating possibility of



Packaged water chillers are furnished complete, ready to install

rusting. Chiller's stainless steel storage tank is fully insulated. Units are furnished complete — mounted, piped, ready to install.

(PCS packaged water chillers are product of Heat-X, Inc., Dept. CP, Brewster, N. Y. . . . or for more information check 6684 on form located opposite last page.)

**Improved-design blenders,
dissolvers announced**

Used primarily for refining viscose rayon solutions, improved-design liquid dissolvers and blenders have been added to manufacturer's line of processing equipment. Units are fabricated of heavy welded steel and consist essentially of a vertical tank, jacketed and baffled for circulation of brine at 50 psi.

Dissolver has working capacity of 1800 gal. Blender is of similar design, but has 8000-gal working capacity. Both have turbine-type agitators. Mechanical shaft seal provides continuous lubrication.

(Blenders and dissolvers are product of Dravo Corporation, Dept. CP, Neville Island, Pittsburgh 25, Pa. . . . or for more information check 6685 on form which is located opposite last page.)

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SPERRY CUSTOM FILTRATION
... HELPS YOU!**



Experience — SPERRY OFFERS YOU the knowledge gained thru 88 years designing and constructing thousands of filter presses for hundreds of industries.

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Engineering — SPERRY OFFERS YOU free consultation. Our laboratory and engineering departments are always at your disposal for information regarding your filtration problems . . . without cost or obligation.

Write for Free 44 page Catalog today

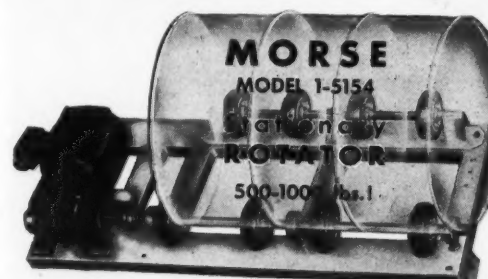
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When inquiring check 6686 opposite last page

HEAVY DRUM ROTATING



Cuts Costs . . . Fast . . . Safe

You can now mix, blend or tumble loads up to 1000 lbs. with the new MORSE Model 1-5154 Stationary ROTATOR. It is primarily engineered for heavy loads in 30 to 55 gallon drums yet lesser loads can be rotated with equal efficiency. Any diameter drum can be mounted by adjusting only three bolts.

The rugged 1/2 H.P. motor can be geared to give any fixed speed; from 5 to 30 RPM. Six inch drive wheels (4) and idler wheels (4) have Neoprene treads for smooth, non-slip revolving. Drive shaft, idler shaft and all welded steel frame are extra rugged construction for long-lasting, trouble free operation.

A double drum model No. 2-5154 with a 2000 lb. capacity is also available. Write today for brochure on complete Morse line.

MORSE MANUFACTURING CO. INC.

737 West Manlius St. East Syracuse, N. Y.

When inquiring check 6687 opposite last page

CHEMICAL PROCESSING

**Polyethylene tower packing
provides 20-40 percent
more efficiency . . .**

pressure drop obtained is only 35 percent of that of other equivalent size packings

Uses: Designed as packing for diffusional operations based on holdup of liquid in interstitial spaces.

Features: Made of light-weight, corrosion-resistant polyethylene, material provides 20-40 percent greater efficiency than conventional packings of equivalent size. Pressure drop is only about 35 percent of that obtained with other equivalent size packings.

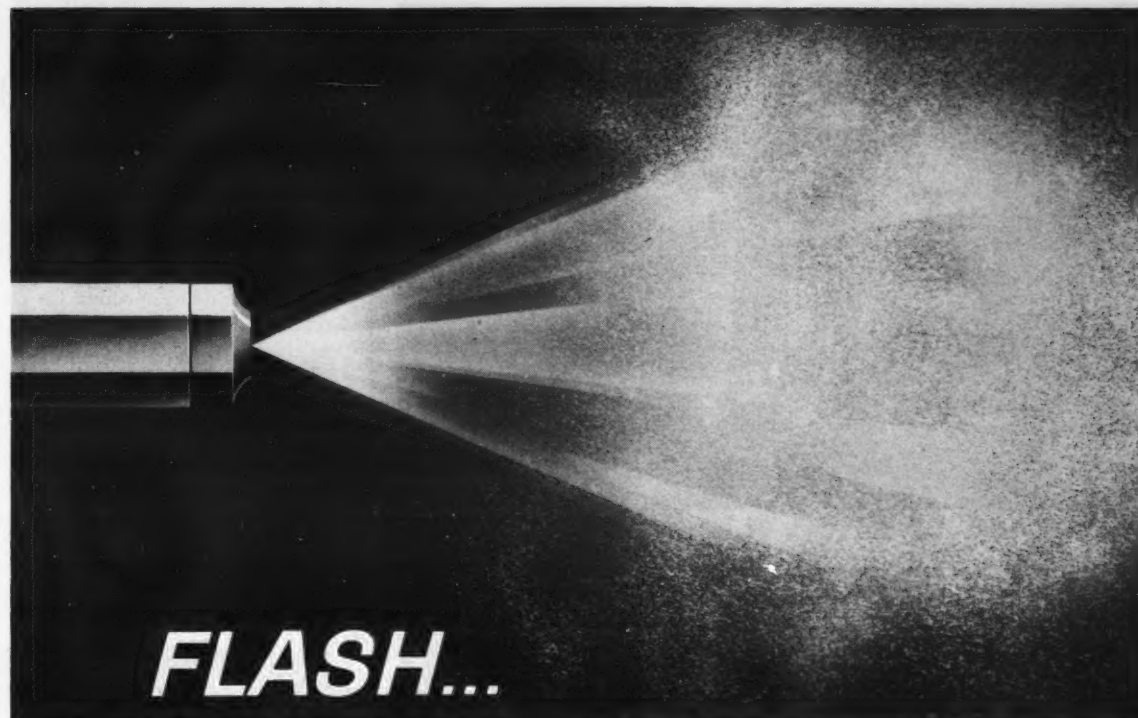
Description: Product's non-compressible toroidal helical shape provides interlocking characteristics which result in high interstitial holdup independent of liquor rates. Clogging is minimized because of material's non-adhering surface. Packing resists most acids, alkalis, and salt solutions.

It is unaffected by such highly corrosive chemicals as hydrofluoric acid and strong caustics. Comparison of physical characteristics of material with those of other equivalent size packings is shown in table below.

| | Tellerettes 3/4"x2" polyethylene (1" nominal size) | Raschig Rings 1" Ceramic | Berl Saddles 1" Ceramic |
|---------------------------------------|---|-----------------------------|----------------------------|
| Free vol, % | 83 | 66 | 69 |
| Surface, sq ft/cu ft | 76 | 58 | 76 |
| Interstitial hold- up points/cu ft | 37,000 | 10,800 | 17,500 |
| Wt, lb/cu ft | 10 | 48 | 45 |
| No. units/cu ft | 1125 | 1330 | 2200 |

Inasmuch as over 60 percent of normal tower installation costs are that of shell, supports, and internals other than packing, savings can also be realized in this respect. For example, for the same capacity, transfer efficiency, and pressure drop, the following reductions can be made in tower design: Cross-sectional area, 40 to 70 percent; height, 20 to 40 percent; weight of internals, 75 percent.

(Tellerette polyethylene tower packing is product of The Harshaw Chemical Co., Dept. CP, 1945 E. 97th Street, Cleveland 6, Ohio . . . or for more information check 6688 on form which is located opposite last page.)



and it's dry with a Buflovak SPRAY DRYER

Gives chemicals, pharmaceuticals,
food products NEW characteristics
. . . NEW markets

From liquid to dry product . . . instantaneously . . . and at minimum cost . . . in compact but accessible equipment that is easily and economically maintained . . . those are some of the advantages Buflovak SPRAY DRYERS provide.

A dry product is produced instantaneously in a Buflovak SPRAY DRYER. The liquid is atomized and sprayed into the center of a hot air stream. Evaporation occurs instantaneously and the dried product is removed from the heating zone so quickly that all its desired characteristics are retained. The operation is fast, sure and economical.

Our engineers will gladly analyze your drying problem and make sound, practical recommendations based on your requirements. A pretest of your product in the Buflovak Research Laboratory and Testing Plant can be arranged. Complete information on request.



BLAW-KNOX COMPANY

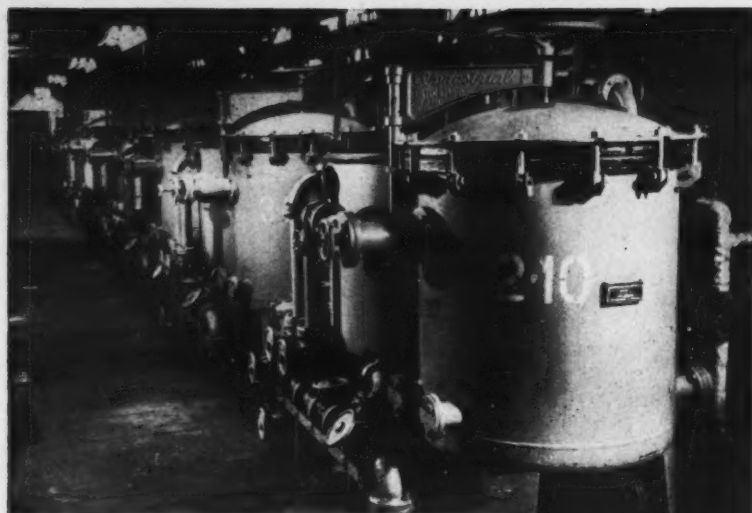
Buflovak Equipment Division, 1645 Fillmore Avenue, Buffalo 11, N. Y.

Cost-cutting FEATURES of the Buflovak SPRAY DRYER

- HIGH RECOVERY OF SOLIDS—by the most efficient collecting system
- LOW INITIAL COST—compact equipment, easily fitted into existing building
- LOW COST OF OPERATIONS—low power and heat consumption
- EASY TO CLEAN—complete accessibility
- LOW MAINTENANCE COST—only a few moving parts . . . no filters or bags to replace
- CONTROLLED CHARACTERISTICS OF THE DRY PRODUCT—suitable for market with or without further processes . . . ready for immediate use

ASK FOR BULLETIN NO. 373

When inquiring check 6689 opposite last page



FILTRATION PROBLEMS?

... SEE INDUSTRIAL'S NEW BUILT-TO-ORDER FEATURES

Industrial offers much more than a line of standard filters... a complete filtration engineering service from fluid analysis to installation. Industrial is ready and able to help you specify the right equipment for common or unusual needs.

Easily adapted for special uses... these Vertical Filters typify Industrial engineering... purposely designed to be built for your exact needs. Several of the many possible modifications are shown at the right... for recovery of large volumes of solids the bottom opening filter is ideal; for smaller volumes, the clean out door is more practical and less costly. Another example of specialization is the jacketed shell filter, for use where small temperature variations are important. Other optional features are quick-opening covers, individual leaf outlets and self-cleaning devices that offer sluicing, shaking or air wash cleaning.

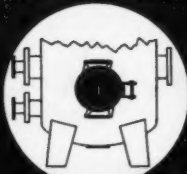
Lower filtration cost... proven performance, minimum down time, the use of low cost but efficient filter media plus a design exactly suited to your needs, all contribute to Industrial's low over-all cost per gallon of filtrate.

Write now for details on flow systems, special equipment, filter and leaf construction. Ask for 8 page Bulletin III.

MODIFICATIONS



RECOVERING LARGE VOLUMES OF SOLIDS



RECOVERING SMALL VOLUMES OF SOLIDS



JACKETED SHELL FOR UNIFORM TEMPERATURE



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FILTER & PUMP MFG. CO.

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CENTRIFUGAL PUMPS • PRESSURE FILTERS • ION AND HEAT EXCHANGERS • RUBBER LININGS • WASTE TREATING EQUIPMENT

PROCESSING EQUIPMENT

'Sapphire' rods cut grinding time, have long service life

Cylindrical spheroid design gives maximum contact area, can reduce processing time by 25%.

Uses: Grinding medium for chemicals, pharmaceuticals, ceramics, pigments, and similar material.

Features: Hardness approaches that of the diamond — resulting in faster grinding and longer service at lower cost per ton of material processed. Rods are highly uniform, have dense structure, are inert, and will not discolor, rust, burn, or decompose.

Description: Diamonite grinding rods were developed during World War II to grind hard, abrasive aluminum oxide for wartime applications. Material is actually a synthetic sapphire substance,



In typical application, volume loss was only 10 percent after 18 months (center), 37 percent after 49 months (right). Original rod is at left

composed of fine-grain crystals of high-purity aluminum oxide held together by a non-metallic vitreous bond, developed by a patented high-temperature process. Cylindrical spheroid design affords maximum contact area.

Product is available in two sizes: 13/16" diam x 13/16" long, and 1 1/4" diam x 1 1/4" long. Former has bulk weight of 0.732 oz per piece, latter 2.745 oz. Prices for the two sizes are: 13/16", 29 cents/lb; 1 1/4", 26 cents/lb. Other properties are as follows:

| | |
|---------------------------|--------------|
| Tensile strength, psi | to 28,500 |
| Compression strength, psi | over 500,000 |
| Sp gr, gm/cm | 3.6 |
| Hardness, Rockwell A | 94 |
| Modulus of rupture, psi | over 500,000 |
| Softening temperature, °C | 1850 |
| Color | white |

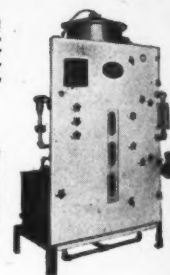
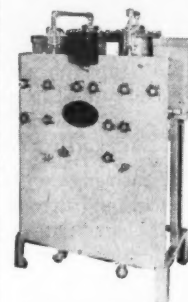
Because of their high resistance to wear and to all acids and alkalis, rods give exceptionally long service. As an example, when used in pebble mill to disperse pigment in a vehicle and to break up pigment agglomerates, volume loss was only 10 percent after 18 months, and 37 percent after 49 months (over 18,000 hr service). Even after losing 37 percent of their volume, rods still retained their cylindrical shape and, in a large measure, their grinding efficiency. Without speeding up mill,

ILLCO-WAY

ionXchange

"PACKAGED" DE-IONIZERS

Right, standardized Model MB Mixed-Bed De-ionizer available in four sizes for maximum flow rates ranging from 150 to 1000 gals. per hr.



Left, typical Model LU or MB Two-Bed De-ionizer, each series made in six sizes covering maximum flow rates ranging from 150 to 1000 gals. per hr.

COMPLETELY ASSEMBLED AND TESTED AT FACTORY

If you can determine the capacity and flow rate you need, you can pick out a ready-made ILLCO-WAY unit that is all set to be hooked into your lines and go to work. Three series of models are designed to provide different degrees of water purification and different types of treatment, as required by individual situations. All models and sizes have been thoroughly time-tested and have proved highly satisfactory in hundreds of installations.

READY TO OPERATE AS SOON AS CONNECTED

Each one of these "packaged" De-Ionizers is assembled at the factory, the resins put in the tanks, and the completed unit given a working test. Then, without dismantling in any way, it is crated, and is ready for shipment. For full details and specifications, write...

ILLINOIS WATER TREATMENT CO.

ionXchange

ILLCO-WAY

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ILLINOIS

NEW YORK OFFICE: 141 E. 44TH ST., NEW YORK 17, N.Y.
CANADIAN DIST: PUMPS & SOFTENERS, LTD. LONDON, ONT.

When inquiring check 6691
opposite last page

CHEMICAL PROCESSING

When inquiring check 6690 opposite last page

PROCESSING EQUIPMENT

grinding time was reduced 25 percent.

(Diamonite grinding rods are product of Diamonite Products Division, U.S. Ceramic Tile Company, Dept. CP, Canton 2, Ohio . . . or for more information check 6692 on form opposite last page.)

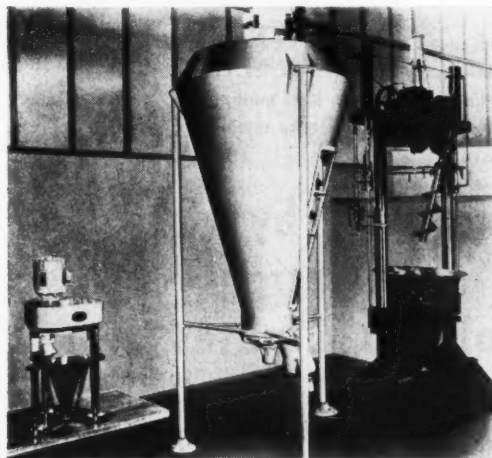
Uniform blending without dusting assured by mixer

Uses: Uniform, quick mixing of any number of dry materials, similar or different in characteristics. Mixer can also be used for wetting dry materials with small quantities of liquid, or to dissolve solids in liquids.

Features: Processional motion of revolving screw flight permits uniform mixing of any number of products, in any proportion, without dusting or particle modification.

Description: Mixer consists essentially of a stationary inverted conical body having a revolving screw flight traveling around interior wall. Body can be provided with jacket for heating or cooling during mixing.

The revolving screw flight lifts the material to the top and provides positive mixing action as it travels around inside surface. Mixer has no external moving parts. Mixed material is discharged at



Mixer is available in laboratory, pilot plant, and full production models

bottom of cone. To accelerate discharge operation, direction of screw flight is reversed, forcing material through discharge opening. Unit can also be equipped for automatic charging. It is available in laboratory, pilot plant, and production models.

(Nauta mixer is product of Buřlovak Equipment Division, Blaw-Knox Company, Dept. CP, 1543 Fillmore Avenue, Buffalo 11, New York . . . or for more information check 6693 opp. last page.)

When you consider

COST

also consider

PERFORMANCE

BE SURE—in your estimate of drying equipment costs— TO INCLUDE:

UNIFORMITY OF PRODUCT
•
LONGER EQUIPMENT LIFE
•
LESS OPERATING DOWNTIME
•
HIGHER PRODUCTIVITY
•
MANUFACTURER'S SERVICE TO YOU
•
LOW MAINTENANCE COSTS



Proctor is your best investment when you consider these factors in the selection of drying equipment.

Hundreds of successful installations of Proctor Equipment give proof of these extra performance values.

You'll profit by specifying Proctor.



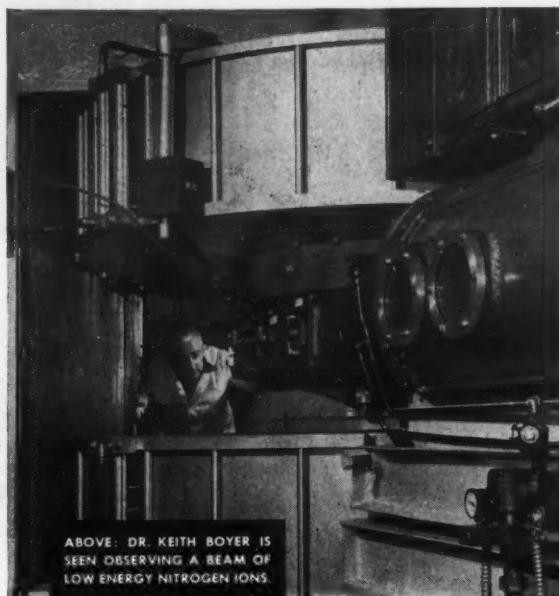
PROCTOR & SCHWARTZ, INC.

Philadelphia 20, Pa.

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When inquiring check 6694 opposite last page

BASIC RESEARCH at los alamos



ABOVE: DR. KEITH BOYER IS SEEN OBSERVING A BEAM OF LOW ENERGY NITROGEN IONS.

The cyclotron shown above is one of the many types of advanced research equipment in use at Los Alamos. This variable energy machine is designed to accelerate high intensity beams of all the hydrogen and helium isotopes.

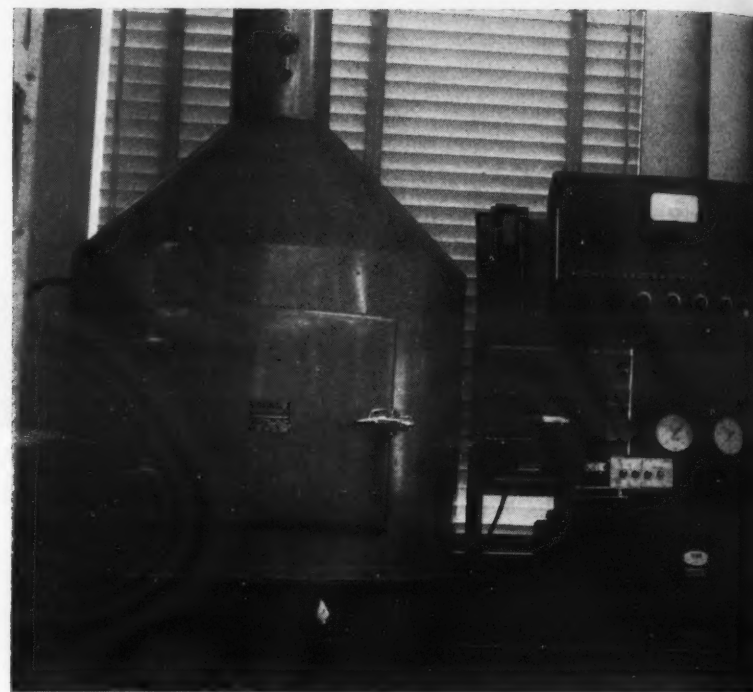
The Laboratory offers a wide range of opportunities to do research and development work in the fields of Physics, Chemistry, Metallurgy, Mathematics, Computing and Engineering.

If you are interested in learning more about career opportunities at Los Alamos, write—

DEPARTMENT OF SCIENTIFIC PERSONNEL
Division 1002

los alamos
scientific laboratory
OF THE UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO

for the laboratory



CP Staff Photos

Combination of sensitivity and speed required in lube oil analysis by flame spectroscopy at Cities Service Research went beyond instrument capabilities. By using a light multiplier in conjunction with their instrument, Cities Service chemists . . .

increased sensitivity by 10^4
— now run "interfering"
determinations in minutes

Photomultiplier attachment for flame
spectrophotometer is now "required" equipment

WILLIAM C. CLARKE, Assistant Editor
With FRANK J. HERBERT, Chemist
Cities Service Research and
Development Company
East Chicago, Indiana

Problem: Development of lube oil additives at East Chicago labs of Cities Service Research and Development Company needed fast determinations of how much additive remained in the oil after engine test runs. In turn, these determinations hinged on analysis of oil for several metals — calcium and barium among them. Since the program was geared to

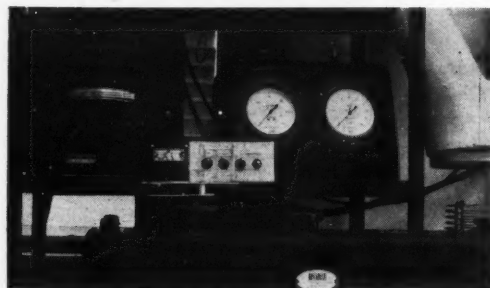


Chemist Frank Herbert operates recording flame photometer

making determinations in minutes, flame spectroscopy was a natural answer. It worked well for several metal tests. Calcium and barium, however, can be mutually interfering. With 0.03 to 1% calcium and barium present, slit widths to reduce interference became impossibly small. At a slit width of 0.3 mm, resolution of the instrument was too low to accurately determine calcium and barium.

Solution: By replacing photocell detector and amplifier with recording photomultiplier unit, flame photometer was modified to increase sensitivity approximately 10,000 times. The photomultiplier allowed reduction of slit width to 0.03 mm. Chart

(Please turn to next page)



Controls for recording unit

Have you tried **MICRO-CEL[®]**

- to absorb liquids
- to provide bulk
- to prevent caking
- to control viscosity
- to extend pigments
- to aid suspension
- to reduce surface sheen

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Want to prevent caking? Try *Micro-Cel*—its high absorption works wonders in controlling deliquescent products.

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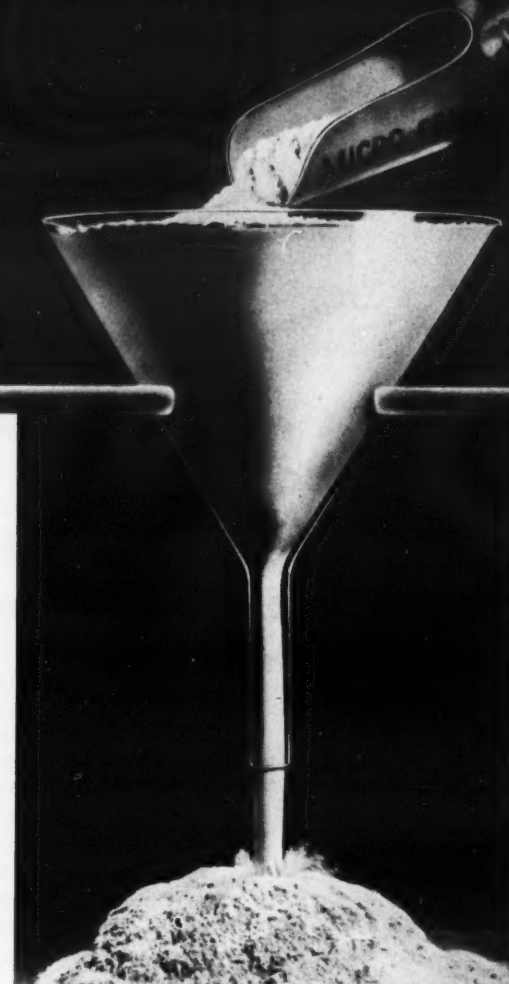
Micro-Cel is a brand-new line of synthetic calcium silicates produced by combining lime with diatomaceous silica under carefully controlled conditions. Its unique combination of properties has already brought important benefits and savings to many processors. Maybe you will be next. Just mail coupon for further information, samples and technical assistance.



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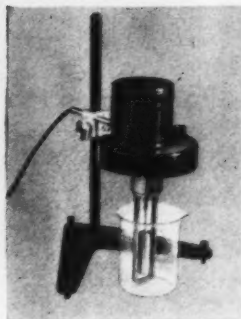
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FOR THE LABORATORY

Recording Photomultiplier

(Continued from preceding page)

recorder gave continuous recording of the absorption spectrum or flame emission. Rapid method was also developed for determination of calcium and barium with a simplified procedure.

Extra sensitivity of photomultiplier permits operation at extremely low levels of light intensity. Effects of background radiation on flame and reflectance measurements are also reduced by the instrument.

Diluting a weighed sample to volume with reagent grade benzene is all that is required for the Cities Service fast analysis of lube oil. Sample is then fed into oxyhydrogen flame and voltage readings are read on strip chart. Comparison of unknown with standards indicates quantitative amounts of calcium or barium directly in mg per liter.

In operation, recording photomultiplier unit has greater sensitivity in range of 320 to 600 millimicrons. Desired wavelength range is scanned at pre-selected speed while, at the same time, amplifier circuits convert received signal into voltage capable of operating standard potentiometric strip-chart recorders. Scanning speed is varied through 5, 15, 50, 100, or 150 minutes for full length of wavelength scroll. Synchronous motor gives point-for-point registration.

Cities Service spectroscopists built the recording photomultiplier unit according to the design of King and Priestley. Similar equipment has now been made available by a manufacturer.

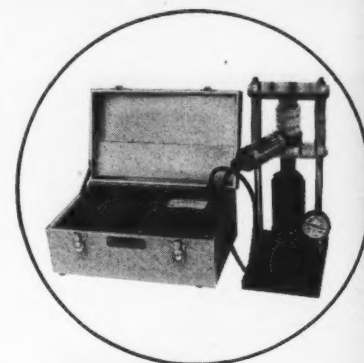
Results: This modification has increased sensitivity of the flame photometer by over 10,000 times. Instrument has been used to qualitatively analyze for 13 metals: calcium, barium, sodium, potassium, lithium, strontium, magnesium, iron, copper, lead, chromium, nickel, and silver. Aluminum, zinc, and tin cannot be detected because excitation of the oxyhydrogen flame is not high enough.

Laboratory has been using this modified equipment for approximately two years. Records have been kept over that time and it is estimated that over 18,000 man-hours have been saved in running over 1100 samples (as compared with gravimetric methods). Use of a clear plastic template in chart reading has also saved time.

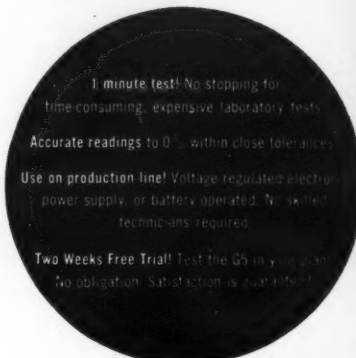
Cities Service laboratory procedure is presently being revised to take advantage of accuracy and speed of the flame method. Thirteen metals will be reported on a semi-quantitative basis, rather than qualitative.

(Information on Beckman recording photomultiplier for Beckman DU flame photometer is available from A.S. LaPine & Company, Dept. CP, 6001 S. Knox Ave., Chicago 29, Illinois . . . or for more information check 6697 opposite last page.)

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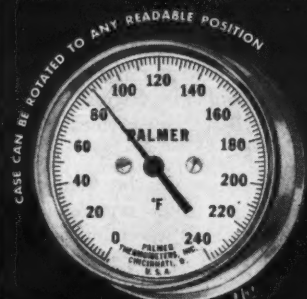
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THERMOMETERS, INC.

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Mfrs. of Industrial Laboratory Recording
and Dial Thermometers

When inquiring check 6699
opposite last page

JULY 1956

FOR THE LABORATORY

**Automatically controls rate
of reagent feeding
and runs curve**

Uses: Automatically titrating highly-colored or opaque solutions, both aqueous and non-aqueous, of organic and inorganic chemicals, petroleum products, drugs, rubbers, waxes, solvents.

Features: Titrator automatically controls rate of reagent feed and plots titration curves.

Description: Titrator has an electronic feed control relay to regulate reagent feeding. Electronic recording potentiometer records both volume of titrant added and voltage applied. Sensi-



End points are automatically recorded on chart

tivity of end-point determination is based on detection circuit utilizing grid currents of 0.1 micro micro amps. Instrument eliminates manual plotting and manual addition of titrant. Complete titration can be completed in five minutes or less with an accuracy of 0.05 ml (one drop) — even with two or more end points.

(Dual recordomatic titrometer is product of Precision Scientific Co., Dept. CP, 3737 W. Cortland St., Chicago 47, Ill. When inquiring check 6700 on form opposite last page.)

- * Why the "odd" size of CHEMICAL PROCESSING?
- * Why its "different" editorial treatment?
- * Why no subscription charge?

See explanatory letter from the Editors
on page 118.

NEW

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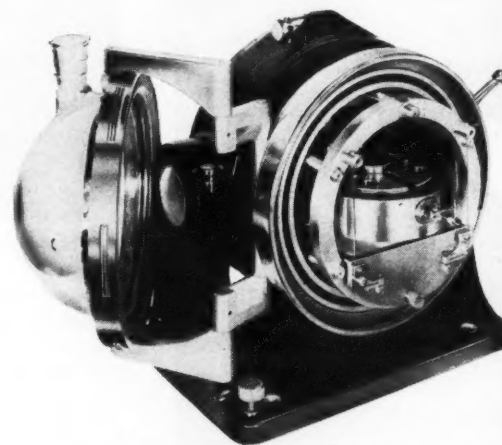
FOR THE LABORATORY

Measures small forces . . . directly . . .

RECORDS FORCE-TIME

Uses: As precision balance and recorder for observation of small rapidly changing forces. Can be used to observe action of gases on metals at high temperatures, evaporation of solvent mixtures and decomposition products, drying curves, stress loading, other applications where measurement of force against time is desired.

Features: Recording balance can be used to measure *any small change* in force representing weight, buoyancy, density, magnetic susceptibility, or other forces that can be resolved in range of milligrams and micrograms.



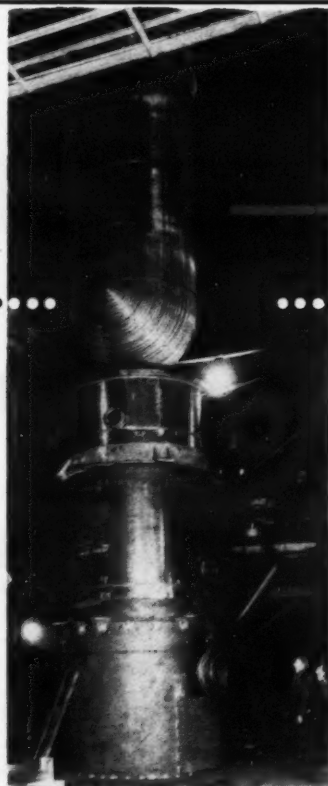
Balance unit is mounted inside bell jar

Description: Recording balance consists of three parts: balance, electronics, and recording units. Three units are mounted together in a unitized structure on which the balance can be operated. Balance unit is also detachable for separate mounting and operation.

Instrument operates by sensing amount of voltage necessary to oppose force directed against balance beam. Balance is mounted upon a seismic mass and has a torsion tube beam suspension to eliminate frictional hysteresis. Beam is designed to allow easy interchange of various fittings at one end and interchange of tare weights at the other. Entire balance assembly is mounted for vacuum operation inside a bell jar.

Electronic unit, which also acts as a base compo-

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-TIME

CONTINUUM

... by resolving small changes in force with a response of ten milliseconds

ment in the unitized structure, consists of three sub-components—the power supply, band pass amplifier, and phase-sensitive detector, oscillator, and stabilizing network. Recording unit is a direct-writing recorder which can be supplied with four ranges of full-scale sensitivity, 25 mg, 50 mg, 100 mg, and 250 mg. Recorder limits reading speed to 1/5 second although response of balance is less than ten milliseconds.

Photo recording oscilloscope or galvanometer is used when full advantage of balance response is required.



Complete recording balance consists of balance (upper left), recorder, and electronic components in base

Recording balance has already been used to discover new decomposition products through observation of unexpected changes or jumps in the temperature-weight curve. Measurement has been made of specific surface of powdered materials by direct weighing of adsorbed gas. Liquid sedimentation particle size studies have been made with the balance using the pan or hydrometer method.

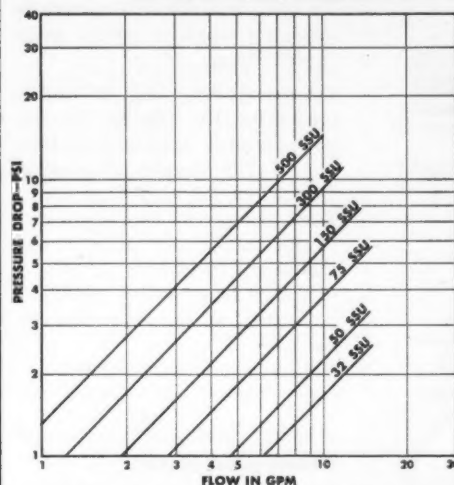
Continuous weight recording has allowed observation, by direct weighing, of heating to constant weight of analytical precipitates. Continuous recordings have been made of changes in specific

(Please turn to next page)

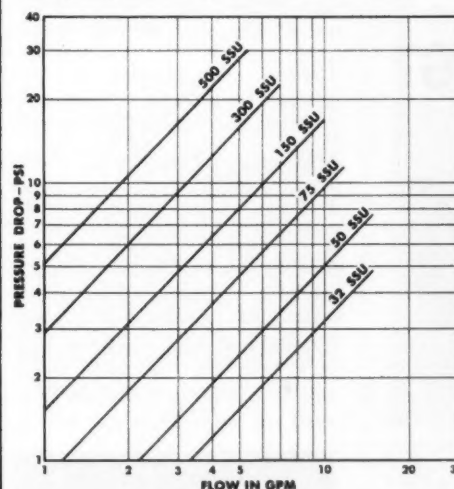
DESIGN AND APPLICATION NOTES ON

Cuno's new Poro-Klean Filter

TYPICAL PORO-KLEAN FLOW DATA



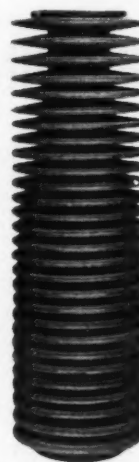
FLOW DATA FOR TYPICAL CYLINDRICAL-TYPE, coarse-grade, PORO-KLEAN filter element, fluid viscosity as parameter. Filtration to 15 microns.



FLOW DATA FOR TYPICAL CELL-TYPE, medium-grade, PORO-KLEAN filter element, fluid viscosity as parameter. Filtration to 5 microns.



CYLINDRICAL TYPE



CELL TYPE

Precision 3-to-30 micron filter for high temperature and high pressure

PORO-KLEAN, Cuno's new porous stainless steel filter material, now offers the chemical, petrochemical, nuclear, and process industries true micronic filtration for temperatures to 900°F and differential pressures to 2000 psi.

Standard in 316 stainless steel, with low carbon content (0.03 to 0.05% max.), PORO-KLEAN is an ideal filter material for use in applications requiring corrosion resistance, high strength (ultimate tensile strength: 25,000 psi), high resistance to hydraulic shock, or positive freedom from fluid contamination.

Typical PORO-KLEAN applications, already in use in the chemical and process industries, are listed below. Approximate flow-rate curves for typical cell and cylindrical standard elements are shown at left (for exact data, see your Cuno representative).

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- Gases into liquids and other gases

If you have problems like these, let Cuno engineers help you apply PORO-KLEAN to their solution. See your Cuno representative, or write Cuno Engineering Corporation, 32-7 South Vine Street, Meriden, Conn. 520



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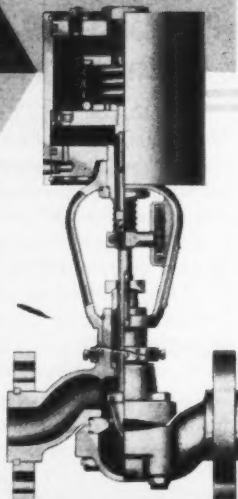
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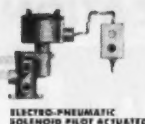


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LABORATORY

Recording Balance

(Continued from preceding page)

gravity. Gas density determinations have also been made continuously.

Applications have even been made in the biophysical field by using the balance to measure contracting forces of muscular fibers under various stimuli.

(Universal Recording Balance is product of The Sharples Corporation Research Laboratories, Division of The Sharples Corporation, Department CP, 424 West Fourth Street, Bridgeport, Pennsylvania... or for more information Reader may simply check 6707 on the convenient Reader Service slip which is located on form opposite the last page.)

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dishes are made of styrene plastics, are optically clear

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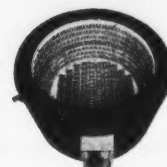


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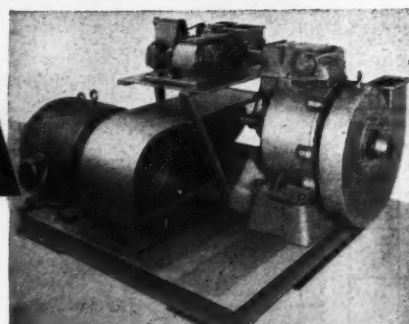
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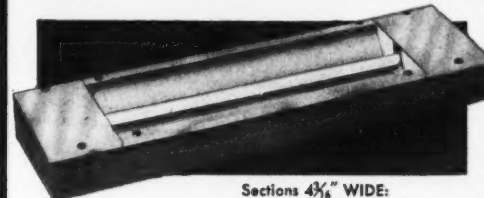
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Sections 4½" WIDE:
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This new unit permits application of radiant heat in areas heretofore inaccessible with larger units • "SAFETY" Infra-Red Oven Sections can be assembled to meet batch-type baking requirements or mounted in a variety of conveyor line baking operations • Uniformity and control of heat is assured by automatic cycling timers and input controllers. Electric interlocking of ovens provides maximum safety to the product • Write for folder, giving specifications and complete data.

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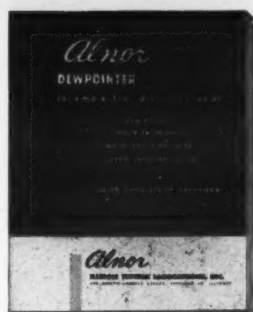
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Package of 20 dishes is supplied in a polyethylene bag with breather top to prevent condensation.

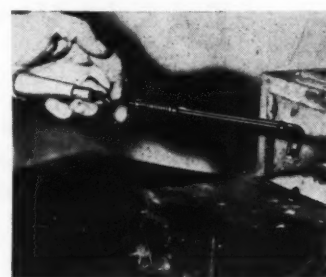
(Plastic petri dishes are product of Chicago Apparatus Co., Dept. CP, 1735 N. Ashland Avenue, Chicago 22, Ill. . . or for more information check 6712 on form opposite last page.)

Grasps and releases
at safe distance
from hands . . .

hand tongs have insulated handle and "squeeze" release

Uses: Handling hot, toxic, or radioactive materials of small dimensions.

Features: Hand tongs can be operated entirely with one hand, leaving other hand free to open doors, covers, manipulate other equipment.



Hand tongs can be operated with one hand

Description: Tongs consist of an insulated handle, stationary arm, and a spring-loaded, movable arm. Right-angle bends at ends of two arms act as fingers. They are normally held closed by spring pressure and are separated by "squeeze" release. Tongs are available in 12, 24, 36, and 48-inch lengths.

(Niptongs are product of The Atomic Center, Inc., 489 Fifth Avenue, New York 17, N.Y. . . or for more information check 6713 opposite last page.)

LABORATORY

OXYGEN

key to modern industrial processes

Control it with . . .

Arnold O. Beckman INC.

OXYGEN ANALYZERS!

Oxygen is one of the most important factors found in modern chemical and industrial processes. Whether to minimize product oxidation (prepared atmospheres, air infiltration, etc.) . . . or to insure adequate oxygen for efficient combustion (boilers, kilns, etc.) . . . or to control oxygen for proper process operations (ammonia, acetylene, air fractionation, etc.) oxygen control has become too important in today's operations for any

profit-minded executive to overlook.

And because they are the *only* instruments that measure oxygen content directly, accurately and conveniently, Arnold O. Beckman Oxygen Analyzers have become the leading instruments for modern oxygen control in a wide range of applications—from catalytic refineries to cement kilns—from power plants to personnel protection.

These instruments (and systems) can be built to meet *your individual needs*.

These instruments offer many unique advantages . . .

SELECTIVITY: Highly sensitive to oxygen. Effects of gases other than oxygen are negligible.

HIGH ACCURACY: 1% of full scale (Example: $\pm 0.05\%$ O₂ on range 0-5% O₂).

MANY RANGES: Full scale ranges from 0-1000 ppm or up to 0-100% O₂ available. Combustion ranges 0-5, 0-10, 0-15% O₂ supplied with 0-25% O₂ check range. Multi-range instruments available.

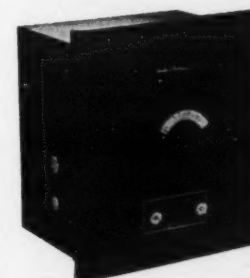
RAPID RESPONSE: Standard Analyzers—95% response in less than 1 minute. Special Units—95% response in 7 seconds!

USE ANY RECORDER: Millivolt output for potentiometers; current output for miniature electronic recorders and galvanometers; air output for pneumatic receivers and control systems.

PACKAGE UNITS: Analyzers and controls may be built into a cubicle with sampling components wired, piped, and ready for installation as a single unit.

SAMPLING SYSTEMS: Complete standard systems—components, package or portable units are available.

OTHER ADVANTAGES: Instruments may be mounted in explosion-proof cases, mounted indoors or outdoors, in portable panels, and have other desired features.



Model F3: Ranges of 0-1%, 0-5%, 0-10%, and higher. Meter on door for convenient readings at sampling point.

Model G2: Full scale ranges 0-0.1%, 0-0.5%, and others for low O₂ content. Ranges 90-100%, 95-100% O₂ for high O₂ content.

The above are but two of the complete line of Arnold O. Beckman Oxygen Analyzers available for every requirement.

Send for helpful free literature which describes Arnold O. Beckman instruments in detail. When writing, outline your particular application—we'll gladly supply specific information.

Ask for Data File 204-76

Arnold O. Beckman INC.

ANALYZERS

Profit Builders for Industry

1020 Mission Street

South Pasadena, California

When inquiring check 6714 opposite last page

When inquiring check 6711 opposite last page
JULY 1956

Only

OLIVER Diaphragm Pumps

satisfactorily handle
heavy abrasive slurry at
MANGANESE CHEMICALS CORP.



The Problem at Manganese Chemical Corp., Riverton, Minn., was to find a method of pumping abrasive slurry containing 60% solids. The material — underflow from the thickeners — had to be transferred to a still to be stripped of NH_3 and CO_2 in MnCO_3 processes.

After considering a number of different pumps *The Solution* was provided with the installation of several Oliver Diaphragm Pumps . . . the only pumps that would satisfactorily handle the heavy slurry.

In operation, air pressure of 60-70 psi is applied to diaphragm at regular intervals to force slurry through pump. Each time air pressure is released by an electric timer, about 6 gallons of slurry is moved. A three-way solenoid valve controls the air. Rate of flow can be changed without stopping the operation.

If you have a slurry or liquid handling problem, the ODS Diaphragm Slurry Pump will do the job more efficiently with less maintenance cost. Write for Bulletin 309-R.

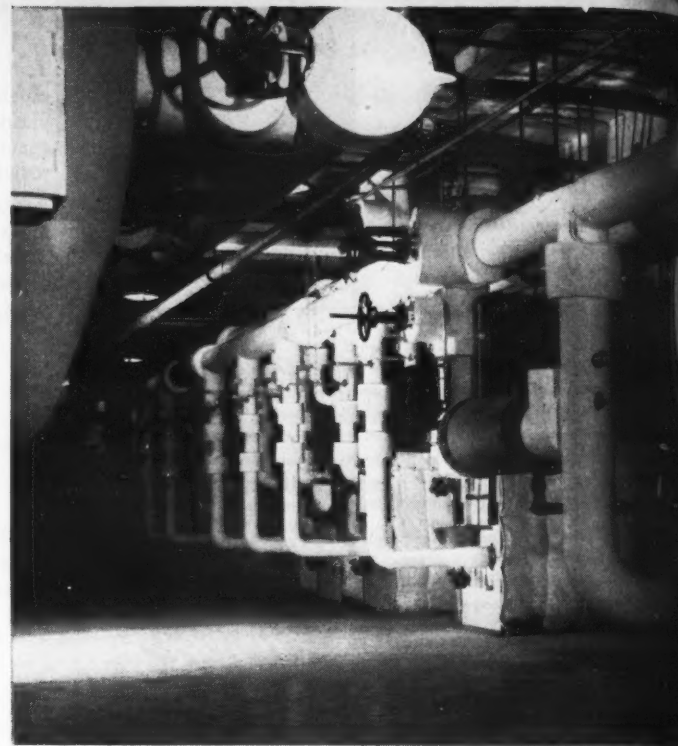
Dorr-Oliver engineers, specialists in pump applications, will gladly discuss your pumping problems. Ask for their assistance.

*Trade Mark Reg. U. S. Pat. Off.



When inquiring check 6715 opposite last page

engineering
and
maintenance



Celanese Corporation keeps pumping costs down by keeping acetate solution temperature up in transfer lines where . . .

EASILY APPLIED INSULATION

Snap-in-place material can be removed for
piping changes or repairs and reapplied
without special crews or equipment

THEODORE W. WETT, Assistant Editor
With **H. F. HUNTER**, Plant Engineer
Celanese Corporation of America, Rome, Ga.

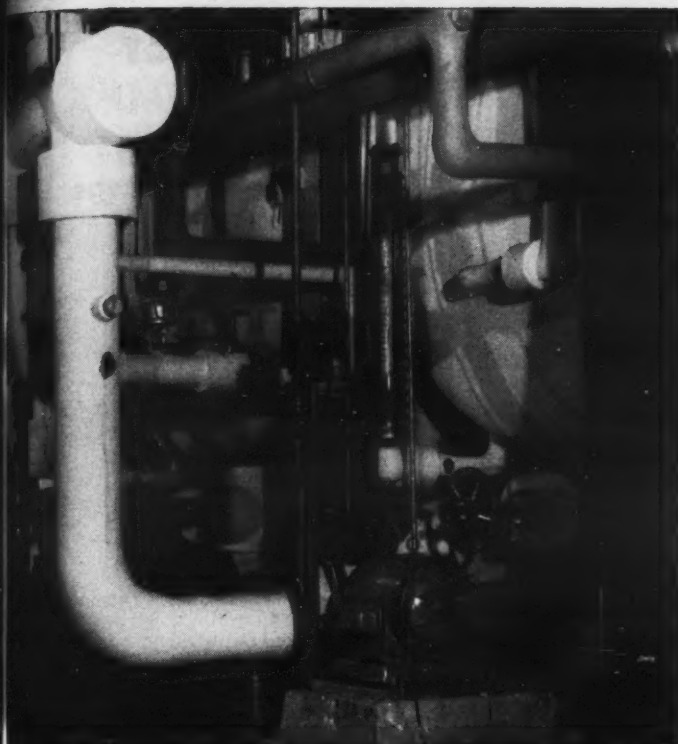
Problem: Acetate solution at Celanese Corporation of America's Rome, Georgia, plant had to be kept hot during transfer from mixers through three stages of filtration. If solution cooled too much, molasses-like consistency would make pumping force required for transfer excessive.

Solvent, water, and pigment lines in process carry both hot and cold material indoors and out. Heat loss or gain in these lines would have a considerable effect on operating costs.

Solution: When Celanese expanded Rome facilities recently, to meet growing demand for acetate fiber, company engineers specified that all lines be insulated. A glass fiber pipe insulation, composed of blown glass fibers bonded with phenolic resin, was selected. Insulation, designated Snap*On, is supplied in one-piece six-foot sections for pipe sizes two inches and over and three-foot sections for pipe sizes under two inches. Sections are spread apart at seam, snapped-in-place on pipe, and fastened with staples. Thermal conductivity (K factor) is 0.31 at 300°F mean temperature.

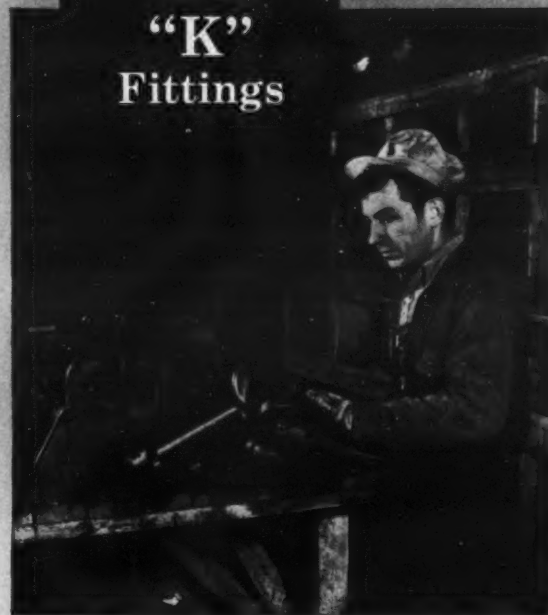
Approximately four carloads of pipe and blanket type material were used ranging in diameter from $\frac{3}{4}$ to 24" and in thick-

CHEMICAL PROCESSING



Insulated lines carrying hot acetate solution from mixers to receiving tanks

This man likes "K" Fittings



We asked him how "K" Fittings compare with others. He said he preferred "K" Fittings for several reasons:

1. K's are easy to start because of the chamfered entrances; also damage to threads is avoided.
2. K's run up quickly and make tight joints because the threads are full and clean.
3. Because of the strong and uniform walls, K's don't crack under strain.

These are the features of "K" Fittings which save workmen time and grief. And they are the features to which we give special attention in our manufacturing and inspecting procedures.

So we say that "K" on a pipe fitting is our guarantee and your safeguard.

It's smart to get fittings from distributors who handle the Kuhns line—the precision-made fittings identified by the "K" trade-mark.



The Kuhns Brothers Co.

1800 McCall St. • DAYTON 1, OHIO

Established 1887

K

When inquiring check 6717 opposite last page

ON CUTS HEAT LOSS

ness from $\frac{1}{2}$ to $1\frac{1}{2}$ ". Lines are color-coded with Armstrong Insulcolor to aid in tracing. Insulation is moisture-proof and non-combustible.

Results: Acetate solution is kept at a constant high temperature of 140°F with little loss of heat or viscosity increase. Heat loss from hot pipes and heat gain in cold lines is prevented.

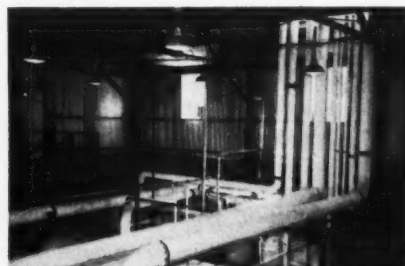
Ease of installation, (material is applied

quickly without special crews or equipment) reduced installation cost. Insulation can be easily removed for changes in or repair of piping and then quickly replaced. Exposure to solvent and climatic conditions has no adverse effect.

(Snap*On pipe insulation is a product of Gustin-Bacon Manufacturing Co., Dept. CP, 254 W. 10th St., Kansas City 5, Mo. Check 6716 opposite last page.)



Cellulose acetate flake storage room with snap-in-place and blanket insulation on pipes and ducts



Interior view of solvent recovery room. Insulated pipes carry solvent from adjoining buildings

LESS DOWNTIME per year with AIRETOOL

An AIRETOOL tube maintenance program including regular use of AIRETOOL Tube Cleaners, Expanders and the Tube Expansion Control System, will keep your operation at peak efficiency and top production while reducing tube failure downtime to a minimum.

The hardest deposits are quickly removed from straight or curved tubes, quickly and thoroughly, with AIRETOOL'S powerful hi-speed cleaners that won't bog down. You roll tight; accurate tube joints with maximum bond when AIRETOOL Tube Expanders are used, while the unique AIRETOOL Tube Expansion Control System can cut time in half, when you overhaul or retube a bundle.

AIRETOOL
6000 SERIES
CLEANER



Airetool ball bearing motor with single expansion cutter head. Motor is slip-fit constructed, has front and rear ball bearing thrusts. Cutter heads are precision made from special heat treated alloy steel, will quickly and thoroughly remove all foreign deposit from tubes. P-Type cleaner head shown is only one of many types available.

COLLINS 3-ROLL
EXPANDER



Airetool Tube Expanders are made from finest alloy steel, expertly designed, precisely machined and heat treated for enduring service. Parallel rolling, self-feeding, they produce uniform expansion and tightness throughout the full thickness of the tube sheet. The G-100 5-roll expander is just one of many available for refinery use.

AIRETOOL TUBE
EXPANSION
CONTROL SYSTEM



The Airetool Tube Expansion Control System automatically and accurately rolls tube joints at production line speeds. Eliminates the danger of over or under expansion, fracture or distortion of tube sheet ligaments. Completely portable for field, shop or new work.



AIRETOOL

MANUFACTURING COMPANY

SPRINGFIELD, OHIO

BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge.

REPRESENTATIVES in all principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.

EUROPEAN PLANT: Vlaardingen, The Netherlands

There's an AIRETOOL Tube Cleaner and Tube Expander for every type of Tubular Construction.

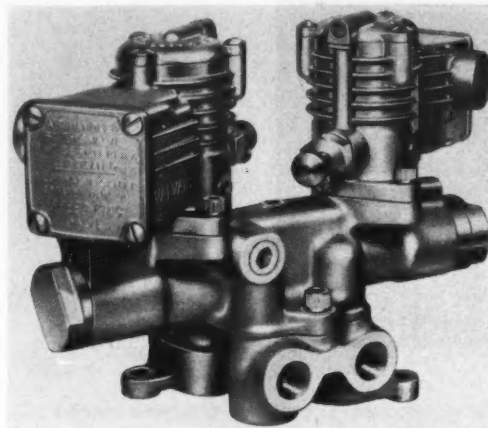
ENGINEERING & MAINTENANCE

**Only momentary electrical contact
needed for valve's operation
— handles 600 cpm . . .**

solenoid unit is both moisture and dust proof,
highly resistant to corrosion

Uses: Automatic control of flow of air, hydraulic oil, or other fluids.

Features: Double-solenoid, pilot-operated, four-way valve requires only momentary electrical contact



Valve's solenoid coils are completely covered with
molded epoxy resin

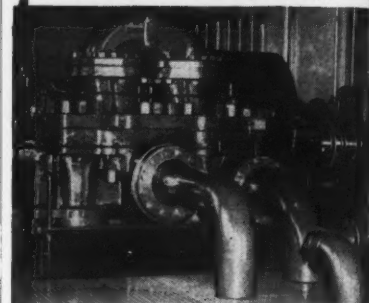
for operation. It is capable of controlling up to 600 cpm. All units are bubble-tested under water to insure that they are both moisture and dustproof. Solenoid coils are completely covered with molded epoxy resin. Bronze body and chrome plated stainless steel stem make unit highly resistant to corrosion.

Description: Valves are available in 1/4, 3/8, 1/2, 3/4, and 1" pipe sizes with foot or sub-base mounting. Stem floats on stationary O-ring packers. Repacking, when necessary, can be accomplished without disturbing piping. Coils for operation on either AC or DC and any voltage can be furnished. Normal service life is estimated to be in excess of 20 million cycles.

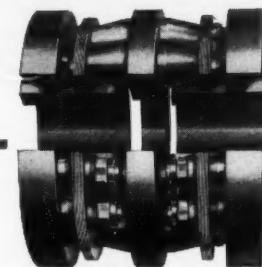
(Speed King valves are products of Valvair Corporation, Dept. CP, 454 Morgan Ave., Akron 11, Ohio . . . or for more information check 6719 on the convenient Reader Service slip which is located opposite last page.)

The alphabetical Product Directory (starting on page 202) will give you a page reference to all articles and advertisements in this issue

PROTECT YOUR PUMPS with THOMAS Flexible Couplings



One Chemical Engineer reports he formerly spent 95% of his time supervising repacking of pump glands. Then he installed Thomas Flexible Couplings. Now his pumps need no attention.



Only THOMAS Flexible Couplings offer:

UNDER LOAD and MISALIGNMENT

1. No Cross-pull on Bearings or Gland.
2. No End-thrust on Bearings or Impeller.
3. Freedom from Backlash—Torsional Rigidity
4. Free End Float
5. Smooth Continuous Drive with Constant Rotational Velocity
6. Visual Inspection in Operation
7. Original Balance for Life—and

**THOMAS ALL-METAL COUPLINGS
HAVE NO WEARING PARTS
SO THEY REQUIRE NO LUBRICATION
AND NO MAINTENANCE**

Write for Catalog 51A

**THOMAS FLEXIBLE
COUPLING CO.**

WARREN, PENNSYLVANIA, U.S.A.

When inquiring check 6720
opposite last page

CHEMICAL PROCESSING

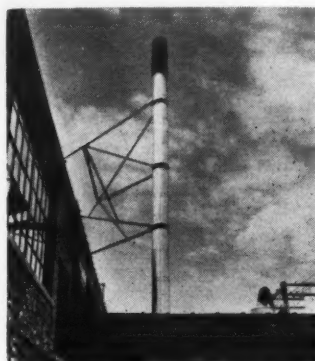
When inquiring check 6718 opposite last page

**Wider range of sizes
gives pre-cast stack
more uses . . .**

now available in complete
range from 10 to 24" ID

Uses: Refractory stack for use
with boilers, furnaces, ovens, re-
torts, and incinerators where
flue gas temperatures do not ex-
ceed 1600°F for continuous
exposure.

Features: Insulated stack is
now available in a complete range
of six sizes from 10 to 24" ID.



Stack sections consist of a ver-
miculite concrete insulating wall
and an aluminum outer jacket

Additional sizes give material
wider range of industrial and
commercial applications.

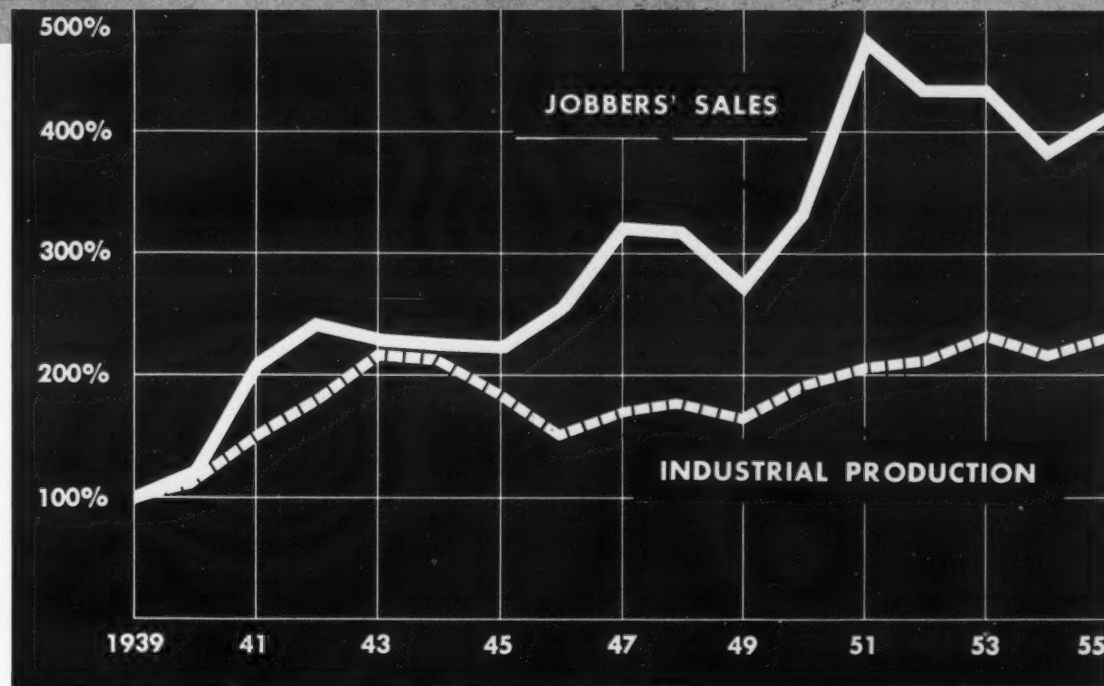
Description: Stack is made up
of factory-produced, 3-ft long
sections cemented one on top of
the other with acid-proof, high-
temperature joint cement. Each
section consists of a vermiculite
concrete insulating wall and an
aluminum outer jacket. Section
joints are made tight by alumi-
num joint bands. Cost is com-
parable to that of a steel stack.

(Pre-cast insulated stack is a
product of Van-Packer Corp.,
Dept. CP, Bettendorf, Iowa . . .
or for more information check
6721 on form opp. last page.)

For more information on prod-
uct at right, specify 6722 . . .
see information request blank
opposite last page.



JOBBER'S Prevent Hardening of the ECONOMIC ARTERIES



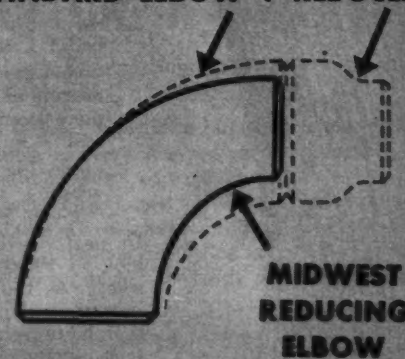
The chart above shows that the jobber is now handling
a larger share of industrial goods than ever before.
Users are finding it to their advantage to look to him for
more of their needs. The jobber reduces the user's inven-
tory, assures prompt delivery, provides technical assistance
when needed . . . and many other benefits. Are you using
him to your own best advantage?

MIDWEST

**Jobbers Save You Money, Time
and Trouble on Welding Fittings**

Midwest Jobbers have the most complete line of welding
fittings . . . which often permits them to improve or simplify
piping. Only Midwest jobbers offer you a full size range
of reducing elbows that take the place of two fittings . . . a
straight elbow and a reducer, thus saving space and one
weld. There are many other advantages to be gained by
using Midwest Welding Fittings . . . see for yourself . . .
ask for Catalog 54.

STANDARD ELBOW + REDUCER



MIDWEST PIPING COMPANY, INC.

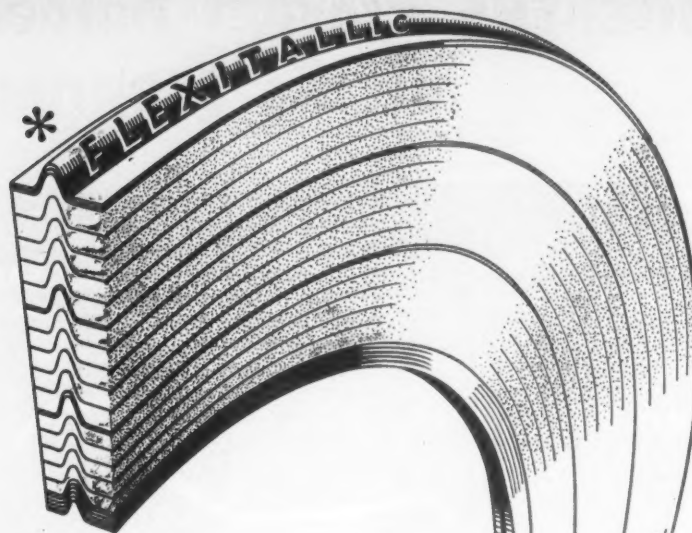
Main Office: 1450 South Second Street, St. Louis 4, Mo.

Plants: St. Louis, Clifton, N.J. and Los Angeles

Sales Offices:

New York 7—50 Church St. • Chicago 3—79 West Monroe St.
Boston 27—426 First St. • Los Angeles 33—520 Anderson St.
Houston 2—1213 Capitol Ave. • Tulsa 3—224 Wright Bldg.
Cleveland 14—616 St. Clair Ave. • Miami 34—2103 Le Jeune Rd.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES



WHERE SAFETY IS NO ACCIDENT

The confidence of engineers in FLEXITALLIC Spiral-Wound Gaskets is based on performance. Flexitallic has justified that confidence for more than 40 years by:

- a continual search for new and better gasket materials
- maintaining standards of engineering and design that give complete assurance of a work-proved seal
- making of gaskets on precision winding machines designed by our own engineers.

In nearly every industry, engineers look to Flexitallic for leadership in safety. As the service becomes more hazardous—in aviation, atomic research, power plants, process industries, and aboard ship—the need for Flexitallic Gaskets becomes more urgent.

Each Flexitallic Gasket is designed and engineered to meet specific con-

ditions of thermal and physical shock, corrosion, vibration, weaving and unpredictable joint stresses. Spirally-wound V-crippled plies of required metal with alternating plies of proper filler result in a resilient gasket having characteristics of a calibrated spring.

Flexitallic Gaskets are at highest efficiency when bolted up cold at a predetermined load. For all pressure/temperature ranges from vacuum to 10,000 lbs., from extreme sub-zero to 2000°F. For all standard joint assemblies. In four thicknesses for special requirements: .125", .175", .250", .285".

FLEXITALLIC GASKET CO.
8th & Bailey Sts., Camden 1, N. J.
Representatives in principal cities

Flexitallic
SPIRAL-WOUND GASKETS

PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

**TEFLON FOR
PROCESS APPLICATIONS**

The ideal seal for many process applications is a Flexitallic Gasket with Teflon trapped between edges of stainless steel. Ask for folder, "Teflon in Flexitallic Gaskets."

*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue—it's our exclusive blue-dyed Canadian asbestos filler.

When inquiring check 6723 opposite last page

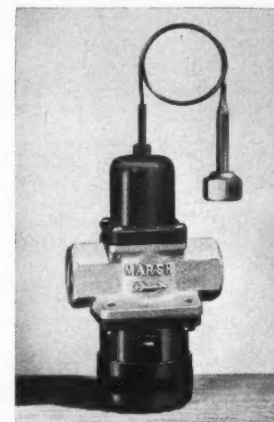
ENGINEERING & MAINTENANCE

**Adjustment range 60 to 260 psi
permits use of valve
on Freon systems . . .**

regulation can be made on-the-job — without wrench or screwdriver

Uses: Condensing water regulation on refrigeration systems. Control is pressure actuated.

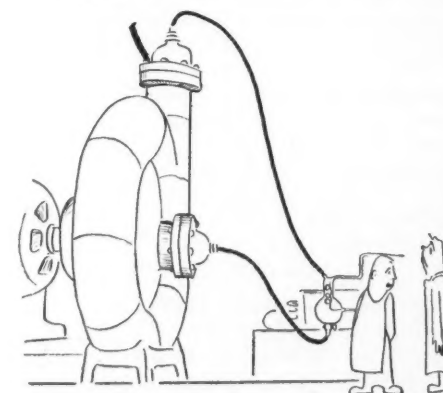
Features: Valve is designed with wide continuous adjustment range, 60 to 260 psi. Range permits use of one valve on either Freon 12 or 22 systems as well as all other common refrigerants except ammonia. Knurled cup permits easy on-the-job adjustment without wrench or screwdriver.



Valve can be used on all common refrigeration systems except ammonia

Description:
Water regulating unit uses direct acting diaphragm. It may be manually flushed and serviced without breaking connections. Valve can be mounted in any position.

(No. 56 water regulating valve is a product of Marsh Instrument Company, Affiliate of Jas. P. Marsh Corp., Dept. CP, 3501 W. Howard St., Skokie, Ill. . . . or for more information check 6724 on form which is located opposite last page.)



"Borrowed it from the production department."

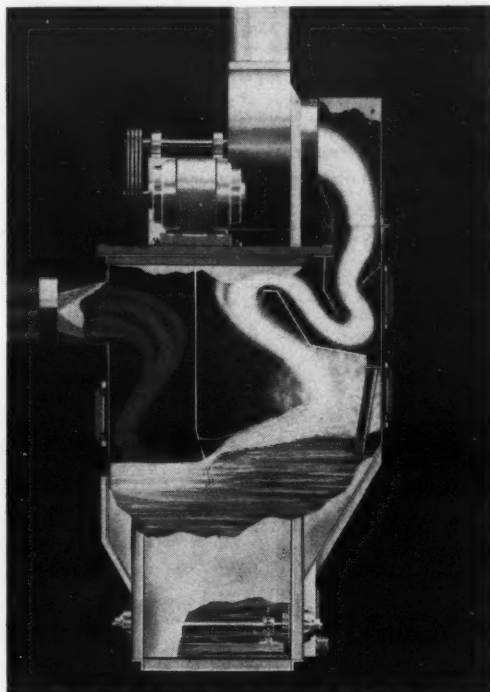
Credit H. H. (Mac) McGriff, of Carbide and Carbon Chemicals Company, South Charleston, W. Va., for the idea that "sparked" this cartoon.

Proper atomizing of water transfers dust efficiently in wet collector . . .

venturi tubes between inlet and discharge provide thorough air-water mixing

Uses: Control of industrial dusts without the use of mechanical means.

Features: Pressure differential developed by venturi tubes between inlet and discharge chambers causes proper atomizing of water and insures thorough mixing of dust-laden air and water. Efficient dust transfer is obtained.



Available in capacities from 1000 to 30,000 cfm

Description: Wet dust collector is available in range of capacities from approximately 1000 to 30,000 cfm in single and double row tube styles.

Air enters collector inlet chamber and expands. Reduced velocity allows heavier particles to sink to bottom of tank as sludge. Air is drawn through venturi tubes into discharge chamber. Low pressure area in venturi throat induces water into high-velocity air stream and provides mixing effect. Air, water, and sludge mixture impinges at high velocity on special surfaces in discharge chamber. Sludge settles to tank bottom. Washed air flows through an eliminator chamber for removal of droplets and clean air is discharged.

(Ventrijet wet dust collector is a product of Pangborn Corp., Dept. CP, 286 Pangborn Blvd., Hagerstown, Md. Check 6725 on form opp. last page.)



SAVED — 28,734 BARRELS OF OIL IN ONE YEAR!

Slop oil carries values in crude products that can be recovered and sold. The price of a barrel of crude varies with the location of its production and every producing area can use efficient filtration equipment for slop oil, containing waste products from the refinery.

Eimco filters for slop oil do an important job for the industry — in most cases, they not only pay for themselves the first year but yield a handsome profit.

Slop oil filtration is only one application for Eimco filters in the petroleum industry. Clarification and polishing of petroleum products as well as other operations use Eimco specialized filters.

Other special designs of Eimco Filters for vacuum and pressure operation are working in Metallurgical,

Food, Drug, Sewage, Sugar, Coal, Chemical and many other fields.

The Eimco Corporation has worked more than half a century to serve the processing industries, providing a background of experience in solving filtration problems which is most valuable to the plant operator. In addition, Eimco's Research and Development Center in Palatine, Illinois is the first complete facilities of its type devoted to liquids-solids separation through filtration.

Facilities unequalled in the industry thus provide Eimco with the "Know-How" to deliver equipment with guaranteed results. An Eimco filter is your assurance of maximum efficiency.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A.

Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa



Q-109

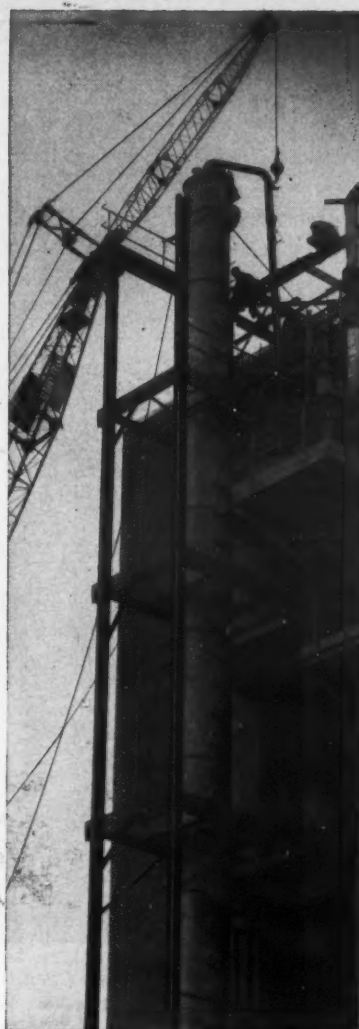
When inquiring check 6726 opposite last page



Line-up was checked with transit to hold close tolerances during welding. Tower passed rigid inspections, was Code stamped.



Motor freight saved time and cost.



Field erection went smoothly.

80-tray tower...by Downingtown

Complete mechanical design and fabrication by Downingtown Iron Works. 80 trays welded in shell. Tray flatness held to unusually close tolerance. Ten-inch handhole at each tray. Customer more than satisfied with performance of tower. Send now for Bulletin PF. See what we've done for others...learn what we can do for you on towers, pressure vessels, process equipment.

Diameter: 36"

Total Height: 92' 6"

Shell Thickness: $\frac{5}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{8}$ "

Material: Carbon steel

80 trays, 45 bubble caps per tray

Downingtown Iron Works, Inc.

HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION

144 Wallace Ave., Downingtown, Pennsylvania—Branch Offices:
52 Vanderbilt Ave., Rm. 2087, New York 17 • 235 Hanna Bldg., Cleveland 15, Ohio
936 W. Peachtree St., N.W., Rm. 126, Atlanta 3 • 208 S. LaSalle St., Rm. 796, Chicago 4
568 Roosevelt Bldg., Los Angeles 17 • 4550 Main St., Rm. 210, Kansas City 6, Mo.
Division of Pressed Steel Tank Company, 1463 S. 66th St., Milwaukee 14, Wis.

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS



When inquiring check 6727 opposite last page

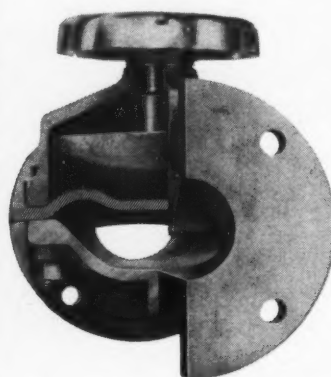
ENGINEERING

**Straight-through flow
for fluids which are
hard-to-handle . . .**

valve provides leak-proof control of acids, slurries or oils

Uses: Control of flow of acids, oils, alkalis, slurries, and hard-to-handle fluids.

Features: Resilient diaphragm and smooth valve floor provide straight-through flow for fluids which are hard-to-handle. Unrestricted fluid path eliminates trapping of suspended matter and prevents fluid from contacting



Provides two-way, leak-proof control of hard-to-handle fluids

valve stem or working parts. Diaphragm is fully supported and controlled by compressor in closed, throttling, and open positions. No packing is necessary and unit gives two-way, leak-proof operation.

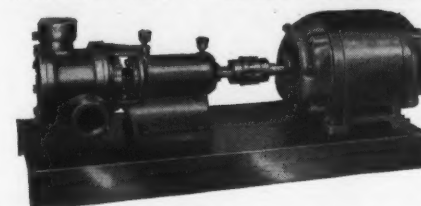
Description: Diaphragm is made of flexible rubber or other material according to use and is molded in the "as closed" position to cut down strain when valve is tightly closed. Units are available in metallic and non-metallic body materials, in sizes from $\frac{1}{2}$ to 14", for threaded or flanged connections. They can be used with pressures up to 250 psi according to size. Diaphragm can be replaced without removing valve from line.

(Wynn straight-through diaphragm valve is a product of Stockdale Engineering Co., Dept. CP, PO Box 144, Haddonfield, N.J. . . . or check 6728 opp. last page.)

handle those difficult jobs



APCO Z4 Process PUMPS



NEW APPLICATIONS—the handling of liquefied petroleum gases, refrigerants and other light non-viscous liquids are easy for APCO Z4 Pumps.

SPECIAL METALS—APCO Z4 Pumps are obtainable in any machineable alloy. The small amount required of such metal represents a real economy.

PERFORMANCE FEATURES—of the APCO Pump are ideal for the type of process duties for which the APCO Z4 Pumps were designed.

Write for BULLETIN 111-ZA

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY

62 LOUCKS STREET • AURORA • ILLINOIS
INTERNATIONAL SALES OFFICE, 80 WEST ST., NEW YORK 6, N. Y.

When inquiring check 6729 opposite last page

FIRM-GRIP INDUSTRIAL GLOVES



GENUINE
RUBBER LATEX
OR
NEOPRENE
LATEX

AMERICA'S MOST POPULAR
HAND SAFETY GLOVES

- **Permanent NON-SLIP** on all 5 fingers and palm. Highly efficient embossed surface is integral part of glove.
- **Curved FINGERS** for comfort and easy use.
- **Tough and Durable.** Longer wear in every pair.

SEND for catalog and prices of complete Industrial Glove line.

**SEIBERLING
LATEX PRODUCTS**

Division of Standard Industries, Inc.
NEW BREMEN, OHIO

When inquiring check 6730 opposite last page

CHEMICAL PROCESSING

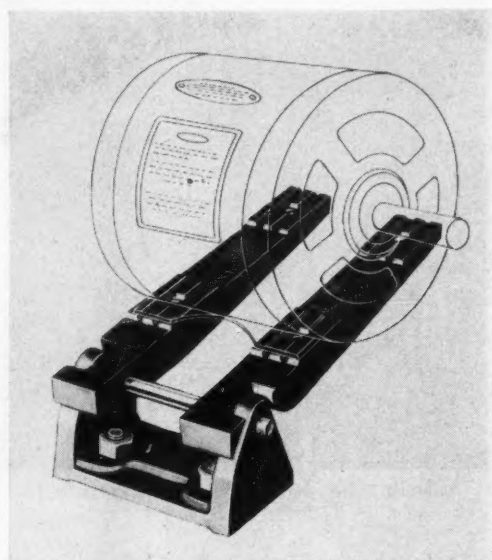
**Exact belt tension maintained
for all load conditions
automatically . . .**

motor base compensates for V-belt stress

Uses: Mounting for motors utilizing a V-belt drive.

Features: Base automatically compensates for belt stress and maintains exact belt tension for all load conditions.

Description: Units are available in four NEMA motor frame sizes from 1/6 to 7½ hp, and are designed for use with horizontally positioned drives. They are not for use on wall or ceiling



V-belts can be changed without disturbing mounting

mountings. Wear on belts and bearings is substantially reduced because proper loading is maintained at all times. Belts can be changed without disturbing mounting.

(Auto-Tension Motor Base is a product of Lovejoy Flexible Coupling Co., Dept. CP, 4872 W. Lake St., Chicago 44, Ill. . . or for more information check 6731 on form opposite last page.)

- * Why the "odd" size of **CHEMICAL PROCESSING**?
- * Why its "different" editorial treatment?
- * Why no subscription charge?

See explanatory letter from the Editors on page 118.



Process equipment have you in a lather? Call **C.S.T.**

It's funny how you never think about soap unless it doesn't happen to be handy when you need it. Sure, we take it for granted, but manufacturing soap—making certain each bar has the same delicate scent as all its brothers and keeping quality control uniform takes a lot of doing by highly skilled specialists.



When soap manufacturers need process equipment they in turn look to specialists in fabricating.

If you require pressure vessels, storage tanks or special alloy equipment, call on Chicago Steel Tank Company when your next fabrication job comes up.

We've been serving the process industries for over 50 years. We know the problems that come up and we're used to working within the strictest code specifications. So if you use process equipment or if you engineer equipment for the process industries, Chicago Steel Tank Company will fabricate it for you.

Write for booklet which illustrates and describes Chicago Steel Tank products.



Fabricators and erectors since 1899

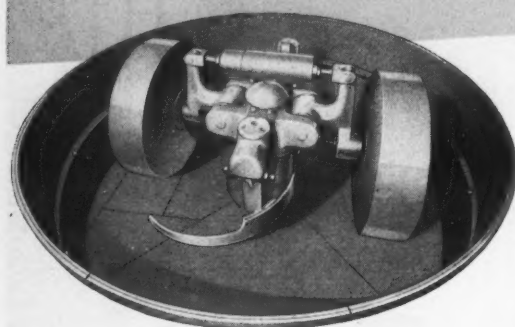
CHICAGO STEEL TANK COMPANY

division of U. S. INDUSTRIES, INC.

SALES OFFICES: 6400 W. 66TH STREET • CHICAGO 38, ILLINOIS • PO-7-8900
51 E. 42ND STREET • NEW YORK, N. Y. • MU 7-9298

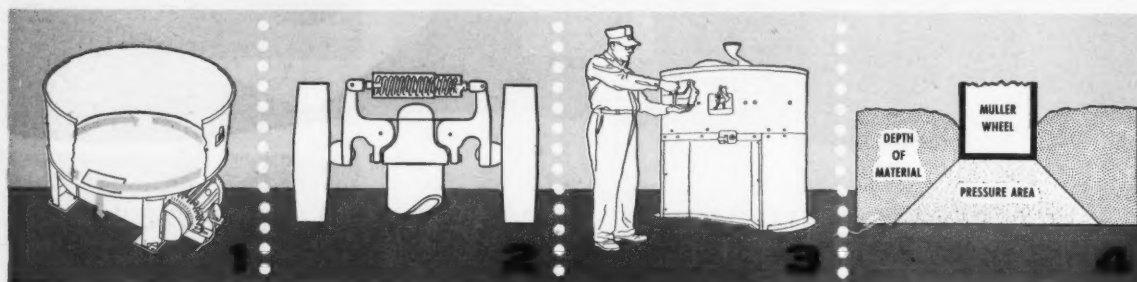
When inquiring check 6732 opposite last page

Here's why **SIMPSON MIX-MULLER®** is today's **BEST BUY** in **MIXING EQUIPMENT**



Interior crib detail of Model 3F; 50 to 60 cu. ft. batch capacity Mix-Muller.

The advantage of preparing dry, wetted or plastic materials in a Simpson Mix-Muller is written in *savings*. Controlled mixing *cannot fail* to result in thorough, effective utilization of raw materials. Adequate control over moisture alone can mean the difference between an unwieldy reject ratio and a profitable mixing operation. Four outstanding features of the Simpson Mix-Muller play an important role in the kind of control over product quality so necessary to return profit from manpower, machinery and materials. See how they are designed to save you time, labor, material, power, maintenance and *money*:



1. BOTTOM DISCHARGE • STATIONARY PAN

Mix-Muller power is used to *mix* . . . none is wasted to move machinery or material mass. Muller and plow action clears pan quickly, thoroughly.

2. SPRING LOADED MULLERS

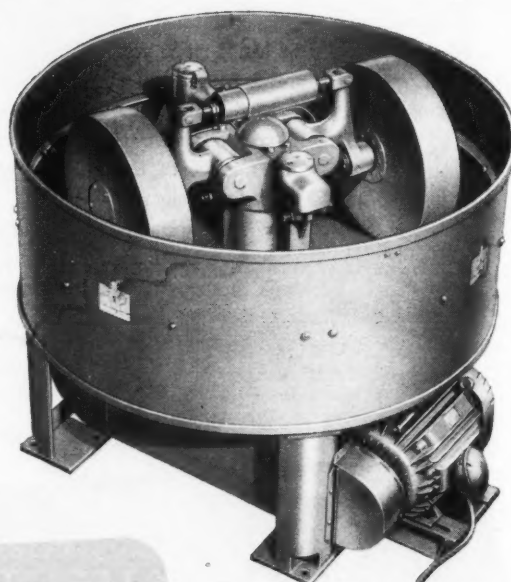
. . . allow muller pressure to be adjusted to the type and density of materials to be mixed. You reduce mulling time, build desired properties faster.

3. SAFE, EASY to OPERATE and MAINTAIN

You get large batches prepared in minutes. Design is simple, rugged. *Intense*, but slow speed, action extends machinery wear life. Maintenance people welcome the self cleaning action.

4. MOST THOROUGH MULLING ACTION EVER DEVELOPED

Thorough dispersion affords high yield of even trace elements and optimum utilization of mixing properties. High muller pressure to area ratio (see chart) assures most mulling per revolution.



Model 2F; 30 to 40 cu. ft. Mix-Muller. Note unit drive—easy adaptability for dust hood or exhaust. It's built to be integrated into a materials handling or continuous mixing system!



NATIONAL
Engineering Company
440 Machinery Hall Building
Chicago 6, Illinois

When inquiring check 6733 opposite last page

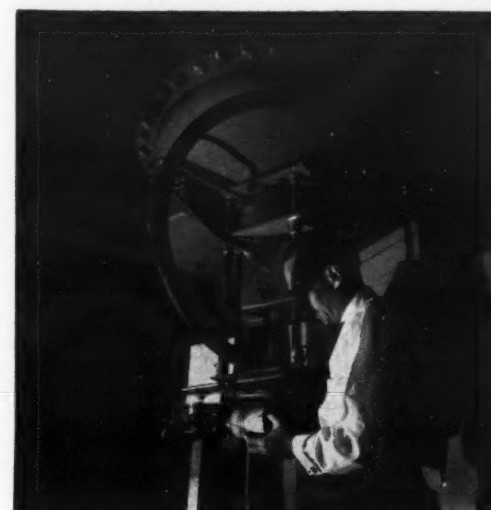
ENGINEERING & MAINTENANCE

Temperature rating of 150°C for continuous operation given wire insulation

Irradiated polyethylene withstands 350°C for short periods of time

Uses: As insulation for wire, for encapsulation of electronic components, or for sleeving.

Features: Material combines excellent electrical properties of polyethylene with structural proper-



Adjusting rollers under electron accelerator prior to irradiating insulated wire

ties of thermoset plastics. It has a temperature rating of 150°C for continuous operation and up to 350°C for short time periods. Insulation is inert in detergents and resists action of aromatic hydrocarbons and most solvents. It is not subject to stress crazing, a serious weakness of conventional polyethylene.

Description: Insulating material, Hyrad, is produced by subjecting a modified polyethylene to massive doses of high energy electron radiation. Radiation operation is performed after polyethylene formulation has been extruded in form of insulation or jacket around a wire or cable. Extrusion can be done either as a solid or foamed,

Typical electrical properties

| | |
|-------------------------------|------------------|
| Volume resistivity (ohms/cc) | 10 ¹² |
| Dielectric constant | |
| Solid | 2.3 |
| Foamed | 1.5 |
| Power factor (at 1 mc) | 0.0005 |
| Breakdown voltage (v rms/mil) | |
| 10-mil sections | 1000 |
| 45-mil sections | 700 |

containing discrete cells of inert gas that reduce dielectric constant to a minimum of 1.48. Following irradiation, wire can be shielded with a copper braid or other suitable material.

Insulation is now being processed in production quantities in four wall thicknesses (10, 15, 30, and 45 mils), ten gage sizes (12 through 30), in ten standard colors, and in spiral striping.

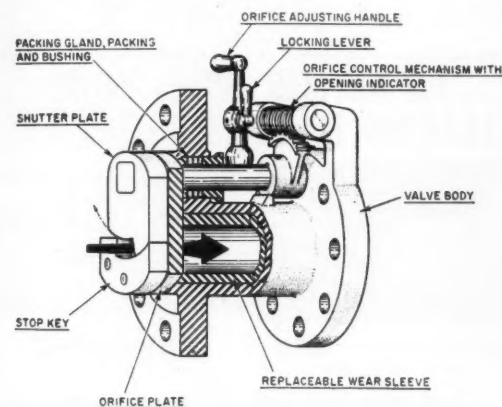
(Hyrad is a product of Sequoia Wire, a Division of The Sequoia Process Corporation, Dept. CP, 871 Willow, Redwood City, Calif. . . or for more information check 6734 opposite last page.)

**Integral opening indicator
facilitates resetting
of valve's orifice . . .**

unit's worm gear permits micrometer control of discharge area

Uses: Accurate control of discharge of processed cellulosic materials from high pressure zone to atmosphere. Units should be applicable to handling of other materials of a similar nature.

Features: Orifice opening indicator on discharge valve facilitates accurate resetting of shutter plate



Replaceable wear sleeve on discharge valve gives increased service life

which controls discharge area. Worm gear and quadrant arrangement, with locking lever, permit micrometer control of orifice and maintains a positive setting.

Description: Unit is constructed of stainless steel and is fitted with a readily replaceable wear sleeve to provide long service life. Valve sizes presently available will handle between 75 and 100 air dry tons of cellulosic materials per 24-hr period. Units are built for 150 or 300 psi.

(Digester valve is a product of Pandia Inc. Div., The Black-Clawson Co., Dept. CP, 250 Park Ave., New York 17, N.Y. Check 6735 opposite last page.)

**no seals
no stuffing box
no leakage**

Chempump

... solves the problem of "problem" fluids

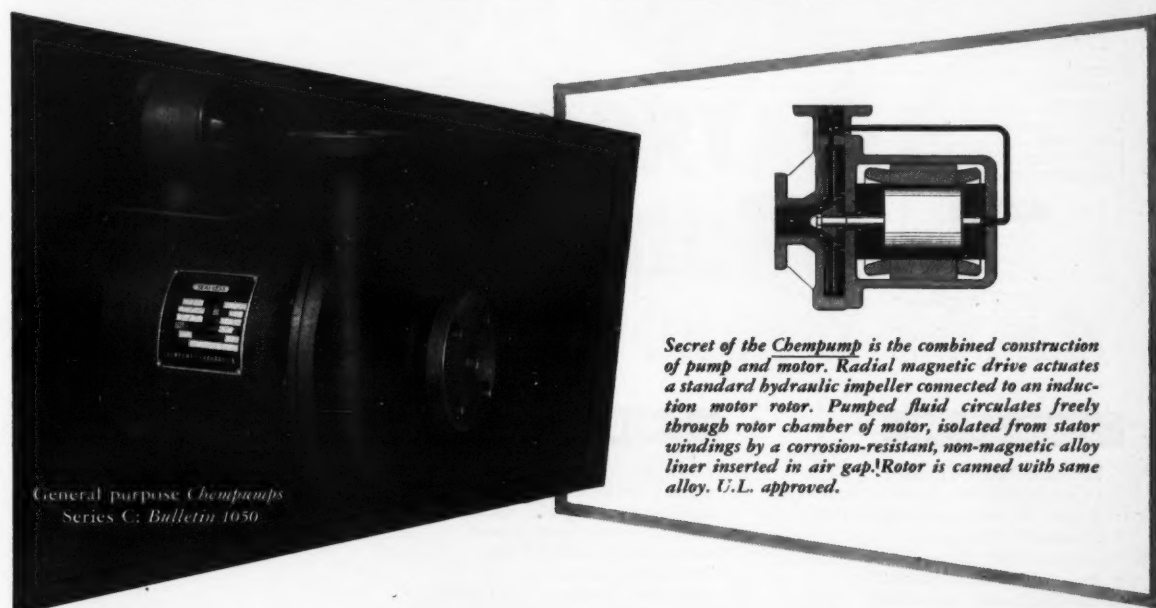
Name your problem fluid, and there's a *Chempump* to handle it . . . without a chance of leakage or contamination. Normally hard-to-handle fluids—volatile, toxic, corrosive, explosive, radioactive, or sensitive—present no problem with *Chempump*.

The *Chempump* is totally enclosed. Both motor and pump are combined in a single hermetic unit. There's just one moving part—the combined rotor and impeller. No packing to "nurse" or replace. No expensive mechanical seals to fail. No shaft wear in the packing gland. And external lubrication is never

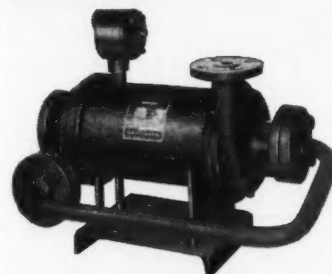
required . . . bearings are constantly lubricated by the pumped fluid itself.

Chempump is available in a wide choice of materials including Monel, Hastelloy B and titanium. Capacities range to 250 gallons per minute; heads to 195 feet. Handles fluids at temperatures to 1000°F and pressures to 5000 psi.

For complete details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



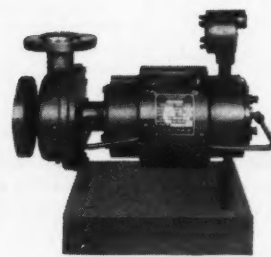
Secret of the Chempump is the combined construction of pump and motor. Radial magnetic drive actuates a standard hydraulic impeller connected to an induction motor rotor. Pumped fluid circulates freely through rotor chamber of motor, isolated from stator windings by a corrosion-resistant, non-magnetic alloy liner inserted in air gap. Rotor is cased with same alloy. U.L. approved.



Two-stage *Chempumps*
Series DE; Bulletin 1020



Low capacity *Chempumps*
Series E; Bulletin 1060



High temperature *Chempumps*
Series T; Bulletin 1040



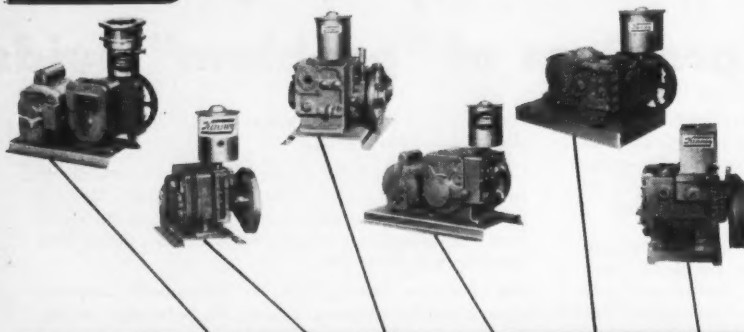
Low-cost *Chempumps*
Series S; Bulletin 1030

Chempump — first in the field—process proved

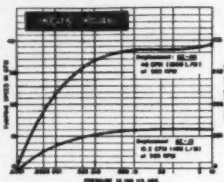
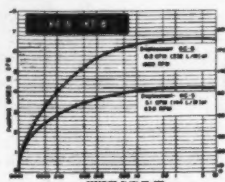
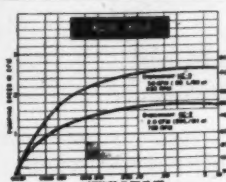
When inquiring check 6736 opposite last page

The facts speak for themselves!
We rest our case!!

Kinney® COMPOUND HIGH VACUUM PUMPS



| | MODEL K-10 | MODEL K-15 | MODEL K-20 | MODEL K-25 | MODEL K-30 | MODEL K-40 |
|-----------------------------|------------------|------------------|------------------|------------------|-----------------|------------------|
| Free Air Displacement . . . | 2.0 CFM | 3.1 CFM | 5.1 CFM | 8.2 CFM | 15.2 CFM | 46.0 CFM |
| Free Air Displacement . . . | 56.5 Liters/min. | 85.0 Liters/min. | 144. Liters/min. | 232. Liters/min. | 430 Liters/min. | 1300 Liters/min. |
| Free Air Displacement . . . | .95 Liters/sec. | 1.41 Liters/sec. | 2.4 Liters/sec. | 3.9 Liters/sec. | 7.3 Liters/sec. | 21.7 Liters/sec. |
| RPM . . . | 755 | 1125 | 650 | 1000 | 535 | 500 |
| Motor H.P. . . . | 1/2 | 3/4 | 1 1/2 | 2 | 3 | 5 |
| Motor RPM (syn.) . . . | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Oil Capacity . . . | 6 oz. | 6 oz. | 1 1/2 pt. | 1 1/2 pt. | 2 qt. | 1 gal. |
| Shaft Diam. . . . | 3/8" | 1/2" | 3/4" | 1" | 1 1/4" | 1 1/2" |
| Inlet Connection . . . | 1/4" Screwed | 1/4" Screwed | 1" Screwed | 1" Screwed | 2" Screwed | 3" Screwed |
| Outlet Connection . . . | Nom. | 1/4" Screwed | 1" Screwed | 1" Screwed | 1 1/4" Screwed | 1 1/2" Screwed |
| Net Weight, Complete . . . | 70 lb. | 78 lb. | 140 lb. | 148 lb. | 300 lb. | 565 lb. |



SUMMATION

- Reliable High Vacuum (Cam and piston displacement)
- Rapid Recovery of Vacuum
- Simple to Maintain
- Dynamically Balanced
- Standard Small Motors
- Gas Ballasted (optional)
- Economical
- Dependable
- Small, Compact Design

VERDICT

Your verdict will be FAVORABLE when you review all the facts. Request Bulletin 403 for additional data, or contact one of our competently staffed district offices in Baltimore, Charleston, W. Va., Charlotte, Chicago (La Grange), Cleveland, Detroit, Houston, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis, or The International Sales Office, 90 West St., New York 6, N. Y.

write today

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3573 WASHINGTON STREET • BOSTON 30 • MASS.
INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

- PLEASE SEND BULLETIN 403 giving complete data on Kinney Compound Pumps.

Name _____

Company _____

Street _____

City _____

State _____

When inquiring check 6737 opposite last page

ENGINEERING

Greater light stability for fluorescent light diffusers . . .

polystyrene shields resist yellowing caused by UV light

Uses: Polystyrene plastic lighting diffusers for fluorescent lights.

Features: Ultra violet light absorbing material combined with plastic, on side nearest light source, provides shield with maximum protection against discoloration caused by UV light.

Description: Shields are for use on troffer units and other fluorescent fixtures. Light stability is achieved without sacrifice of initial color, hiding power, light transmission, toughness, or finish. Accelerated aging tests have shown that diffusers retain initial color even after 60,000 lighting hours use.

(UVR grade diffusers are a product of Sheffield Plastics Inc., Dept. CP, 500 Salisbury Rd., Sheffield, Mass. . . or for more information check 6738 on convenient Reader Service form which is located opposite last page.)



HOW TO BUILD A SAFER STAIRWAY... use TRI-LOK and TRI-FORGED stair treads

For the safest and strongest stairways, insist on Tri-Lok or Tri-Forged stair treads. Cuts slipping to a minimum, eliminates over-stepping. Get complete information on Tri-Lok and Tri-Forged steel grating and stair treads now. Write to

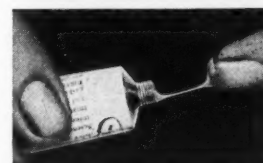
Department D-2707



DRAVO
CORPORATION
Pittsburgh 22, Penna.
National Distributors

When inquiring check 6739 opposite last page

NO MATTER WHAT YOUR LEAKING JOINT PROBLEMS ARE



Leak Lock clings in tough films that stretch rather than break

IT MAY PAY YOU TO TRY LEAK LOCK LIKE OTHER MAINTENANCE MEN HAVE DONE

For 5 years, Leak Lock has been surprising skeptical people who didn't expect to find a "barrier" for an "impossible-to-hold" material. They were surprised at the broad scope of its capabilities.

Leak Lock is being ordered regularly by a well-diversified list of important concerns who regard it as a "find" for special uses.

Send for information and a sample. And here's a tip: Don't depend on a lab. test. Try it on the actual job, and then you will know.

Leak Lock

STEWART INDUSTRIES, INC.
(FORMERLY HIGHSIDE CHEMICALS CO.)
16 COLFAX AVENUE CLIFTON, N. J.

When inquiring check 6740 opposite last page

CHEMICAL PROCESSING

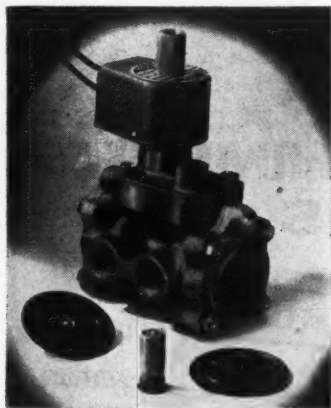
Only three parts to wear means less maintenance on three-way valve . . .

no sliding glands or stuffing boxes required

Uses: Solenoid pilot-controlled three-way control of air, gas, oil, or water.

Features: Valve's design utilizes only three operating parts, a stainless steel core and two molded Hycar diaphragms. Since there are no sliding glands or stuffing boxes, stroke setting, or seat regrinding necessary, there is virtually no maintenance required.

Description: Valves can be used on operating frequencies up to 400 cpm. They provide absolute tight seating on liquids and gases. Unit converts quickly from



Stainless steel core and molded Hycar diaphragms are valve's operating parts

normally closed to normally open operation without removal from pipe line. Valve is currently available in $\frac{3}{8}$ or $\frac{1}{2}$ " pipe connections.

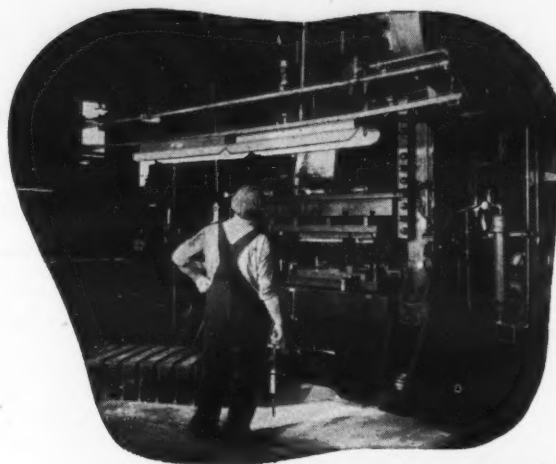
(Bulletin 8316 valves are products of Automatic Switch Co., Dept. CP, 391 Lakeside Ave., Orange, N. J. Check 6741 on form opposite last page.)

For more information on product at right, specify 6742 . . . see information request blank opposite last page. ➡

SAVINGS START

when you stop "hand feeding" hungry bearings...and change lubrication methods from

Backward to Forward!



ALEMITE PORTABLE POWER GUN

saves 23.9 man-hours for every 100 pounds of lubricant

...saves right down the line!

Are you lubricating hundreds of bearings with ordinary hand gun equipment that's best suited to service only a couple of dozen bearings?

An ordinary hand gun can be emptied in a few minutes. But an Alemite Power Gun gives positive, fast, safe lubrication to hundreds of bearings *without a single re-fill!* This difference means a saving of 23.9 man-hours on every 100 pounds of lubricant used. Because lubricants are always kept "refinery-fresh," machines get better protection, have less breakdowns. You make important savings in machine-hours . . . increase production, cut maintenance costs!

An Alemite Portable Power Gun eliminates wasteful spillage . . . makes housekeeping easier, less expensive . . . reduces product spoilage. Air or electrically operated models for all types of lubricants. There's a type and size pump for your plant. Mail coupon at right for the full story about Alemite savings!



• A 400-pound barrel of lubricant—any type—arrives at plant oil room. It's sealed, fresh, "refinery-clean."



• An Alemite Power Transfer Pump is inserted in drum. Lubricant stays sealed against dirt, grit, contamination.



• In just 60 seconds a portable power gun is filled with lubricant that is still as fresh as when it left the refinery. No mess—no waste!



• Alemite Portable Power Gun is ready to roll anywhere in the plant . . . to service hundreds of bearings with clean, safe lubricant!



FREE! New Booklet:
"5 Plans for Better Lubrication"

Alemite, Dept. D-76, 1850 Diversey Parkway
Chicago 14, Illinois

Please send me my FREE copy of "5 Plans for Better Lubrication."

Name.....
Company.....
Address.....
City..... State.....

ALEMITE

REG. U. S. PAT. OFF.

Ask anyone in industry

A Product of STEWART-WARNER CORPORATION



Increase your process efficiency with accurate quality control

Increased process efficiency and precise quality control are only two of the many advantages that result from the application of continuous process refractometry to chemical process streams. This unique physical principle is a quick and simple method of determining whether a specific material, or mixture of materials, meets required specification...

Product variations can be detected with great rapidity because a sample from the process stream itself is continuously flowing through the instrument and is compared with a reference standard. The process can be adjusted to maintain product characteristics within the desired tolerance, with a minimum of sub-standard throughput. These savings alone can quickly pay for the cost of an instrument.

APPLICATIONS—The Barnes Differential Refractometer has wide applications in the chemical, food, refinery and other process industries. Many processes in these industries have used continuous process refractometry for years to monitor product quality. For example, refractometry may be used to control:

Hydrogenation—of fats and oils in food and chemical streams;

Polymerization—of hydrocarbons, vinyls, styrenes, etc.;

Distillation—of petroleum or other fractions;

Blending—of binary mixtures.

OPERATION—The Barnes Refractometer measures an *unchanging and basic physical characteristic of a material*: refractive index. This gives a *true* measurement of stream composition—not a measurement of an environmental variable such as temperature, pressure, flow rate, etc.

The Barnes Refractometer provides a continuous indication of the difference in refractive index between the reference liquid and the continuously flowing sample from the process stream. Differences may be indicated on a scale at the front of the instrument, or they may be transmitted as electrical signals to a recorder controller.

SPECIFICATIONS—The Barnes Refractometer has an accuracy of better than $\pm 1/4\%$ and is available in three models with limiting sensitivities of refractive index covering 0.0001, 0.00001, 0.000002. The optical system is sealed against contamination; the entire instrument is explosion-proofed; the servo measuring system is of the null balance type for highest accuracy.

The Barnes Application Engineering Group is ready to assist you in evaluating the use of refractometry to your control problems. Special Data Sheets to help better service your problems are yours for the asking.

Complete description of the Barnes Refractometer and Data Sheets will be mailed upon request. Barnes Engineering Company, Stamford, Conn.



BARNES ENGINEERING COMPANY
CONTROL THROUGH ANALYSIS

When inquiring check 6743
opposite last page

Functions of after cooler are outlined

Bulletin outlines, through the use of line drawings and photographs, the function of company's after cooler in removing moisture from compressed air and gas. Included are diagrams and illustrations of air liquefaction systems.

Bul 130 is issued by Niagara Blower Co., Dept. CP, 405 Lexington Ave., New York 17, N.Y. Specify 6744 on form opposite last page.

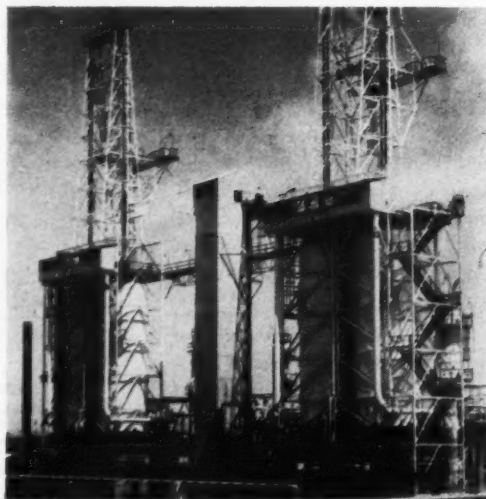
Field stress relief of structures possible by using efficient thermal insulation . . .

mineral wool blankets help to maintain critical temperatures

By preventing excessive heat loss to outside atmosphere, mineral wool blanket insulation has made practical in-place stress relief of large field fabricated structures. Critical temperatures can be established and maintained during required time limits.

During a typical treatment, stress relieving four coke drums at a large west coast oil refinery, required temperature of vessels was 1200°F minimum—with a maximum variation of less than 150°F as required by ASME code. Drums were 18' in diameter and nearly 75' tall constructed of ASTM-A-204 plate lined with 7/64" A-240.

Each of vessels was heat treated in turn by creating a furnace of structure itself. Large oil-fired burners, capable of delivering up to 40,000,000 Btu/hr, fire directly into the vessel to bring it up to critical



Four 75-ft coke drums at a west coast oil refinery were stress relieved in place



Halliburton Oil Well Cementing Company uses VIKING PUMPS

"The fact that Viking Pumps will consistently deliver in direct proportion to their speed makes them a valuable asset to our sand proportioner units", Halliburton comments. Used as metering pumps, Vikings deliver fluid into the mixing tank of the unit, where it is properly blended with the correct amount of sand for hydraulic oil well fracturing service. It is the first practical design for such

work, and is made possible by accurate Viking pumping. From one to four Viking 450 G.P.M. at 260 R.P.M. pumps are used with Halliburton equipment.

If you have a problem where metering, blending or other accurate pumping of liquids is concerned, let Viking help you solve it. Write for information and Bulletin 56Scc.



VIKING PUMP COMPANY Cedar Falls, Iowa, U.S.A.

In Canada, it's "ROTO-KING" pumps

THE ORIGINAL "GEAR-WITHIN-A-GEAR" ROTARY PUMP

When inquiring check 6745 opposite last page

GASKETS · SHIMS WASHERS

From 1 to 1 Million

No matter what type, thickness, shape or quantity required, you can count on Chicago-Wilcox for uniformly accurate gaskets, shims, washers or special stampings.

With 50 years accumulation of dies, chances are we can furnish just what you need without a die charge—thus reducing costs substantially and assuring on-schedule delivery.

Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics . . . teflon, nylon, etc. . . and in quantities to meet your production requirements.

Write for catalog and submit your specifications for quotation.

CHICAGO-WILCOX MFG. CO.

7717 South Avalon,
Chicago 19, Illinois

When inquiring check 6746 opposite last page

To
get
more
information
on
products—
use the
Reader
Service
slip
•
opposite
last
page

temperature. Insulating blankets were secured to exterior surface of drum by $\frac{3}{4}$ " stainless steel bands of expander strap. Asbestos paper, installed on outside of blankets under steel strapping, protected insulation from rain and wind. Spun mineral wool felt 4" thick and 4 lb density, was used to fill in around outlets. Wire mesh was used to support inner surface of insulating material.

Work was done under varying weather conditions. Rain, ambient temperatures ranging from 40 to 70°F, and more than average wind was prevalent. Insulating material withstood weather and eight handling operations with exceptionally little mechanical failure. Fewer than 5000 sq ft were required to insulate all four vessels each having a surface area of approximately 4200 sq ft.

(Mineral wool blanket insulation was supplied by Baldwin-Hill Co., Dept. CP, 500 Klagg Ave., Trenton 2, N.J. . . . or for more information reader may simply check 6747 on form which is located opposite last page.)

(Field stress relief was performed by Chicago Bridge & Iron Co., Dept. CP, 332 S. Michigan Ave., Chicago 4, Ill. . . . or for more information reader may simply check 6747A on form which is located opposite last page.)

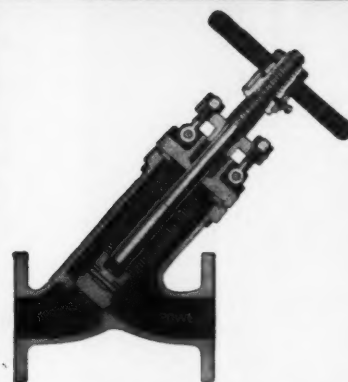


Above cartoon is the work of James J. O'Connor, process chemist with Kimberly-Clark Corporation in Niagara Falls, N.Y.

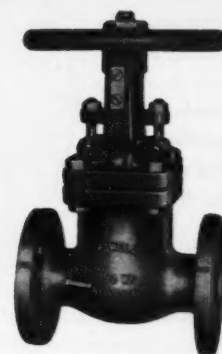
Powell packless valves for hazardous services



BELL-O-SEAL "Y" Valve with welding ends, welded bonnet and outside screw rising stem. Yoke bushing can be removed without breaking body-bonnet joint.



BELL-O-SEAL "Y" Valve (Sectional). Outside screw rising stem. Designed for long life where pressure or vacuum-tight control is essential.



BELL-O-SEAL O.S. & Y. Globe Valve. Bolted bonnet. Outside screw stem rises through upper yoke bushing that revolves with handwheel.

Painstaking quality control is rigidly enforced through every step in the manufacture of these nuclear valves. We begin with the materials—every machining operation is accurately gauged—all parts are thoroughly cleaned and degreased—then every valve is not only subjected to an actual line test, but is given a snifter or mass spectrometer test.

Shown here are examples of the types of valves available to industry for use with heavy water, molten metals, etc. For complete information, consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our Nuclear Valves as well as our complete line of Powell Quality Valves—all with Performance Verified.

The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR



POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

When inquiring check 6748 opposite last page

**We'll shoulder
the entire load...**



from design



**... to
finished
product!**

Goslin-Birmingham's complete, integrated organization is always at your disposal. Our process engineers are available for prompt, on-the-spot technical consultation and planning. G-B takes YOUR processing problem and comes up with the solution...from planning board to installation. Planning, designing, casting, fabricating, installing...G-B shoulders the load all the way. It will pay to solve your processing problems the G-B way.

Shown here are two self-supporting, sextuple effect alumina liquor evaporators now in use at the Reynolds Metals plant in Corpus Christi, Texas.

G-B Engineers are at your service any time
to discuss your processing problems
... without cost or obligation.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM • ALABAMA

When inquiring check 6749 opposite last page

briefs

from contemporary publications

Solar heat pump

A solar heat pump heating system must show a high collector efficiency, be free of operating difficulties, and compete in first cost with other heating systems. Field tests reveal several advantages. Four pages, two figures, one photograph. ("Heating, Piping, Air Conditioning," March 1956, page 108.)

Wood and cellulose

Studies of thermal degradation of wood and cellulose include plots of the logarithms of residual weight against time. Five pages, three tables, six figures, 29 references. ("Industrial and Engineering Chemistry," March 1956, page 413.)

Refining lubricating oils

Dewaxing solvents aid in wax removal; selective solvents have raised stability and efficiency level of oils. Four pages, one table, seven figures, one photograph. ("Petroleum Engineer," March 1956, p. C-70.)

Fluid flow

Fundamentals of fluid flow are covered under headings of definitions, measurements, type, Reynolds numbers, surface roughness, and pipe size. Two pages, two figures. ("Petroleum Processing," March 1956, p. 149.)

Antibacterials

Effect of antibacterial agents in soap is reported. Protein absorption aspects are included. Four pages, four tables, two figures, five references. ("Soap," March 1956, page 79.)

Textile strength

Sixteen fabrics of military importance were tested by the Tongue (single rip) and Trapezoid methods. Data are analyzed and interpreted in detail. Eight pages, five tables, seven figures, six references. ("Textile Research Journal," March 1956, page 169.)

Recovering indium

Recovery of indium from other members of the platinum group is considered. Methods of separation, uses, supplies, prices, and chemical and physical properties are included. Two pages. ("Canadian Mining Journal," March 1956, page 61.)

Silicones

From England comes a discussion of properties and applications of silicone insulants. Silicone rubbers, fluids, and cements are covered. Five pages, six tables, nine figures, two references. ("Electronic Engineering," March 1956, page 115.)

Vapor yields

New equations and nomographs from South Africa save time in flash calculations for the petroleum industry. Two pages, one figure, two references. ("Petroleum Refining," April 1956, page 208.)

Mixed fertilizers

Following aspects of the granulation of mixed fertilizers are discussed: particle size, shape, and structure; drillability; and efficiency. Four pages, 14 references. ("Agricultural Chemistry," April 1956, page 35.)

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

Degradation tests

A nondestructive mechanical degradation test involves vibrations of low amplitude and requires only 1/40 as many specimens as do the usual tests. Six pages, one table, 10 figures. ("Modern Plastics," March 1956, page 143.)

Structural cermets

Properties and applications of titanium carbide cermets and similar products are discussed and illustrated. Microfilm prints and strength curves are included. Six pages, one table, eight figures. ("Ceramic Age," April 1956, page 32.)

Twin quarrying

How to produce high-calcium limestone and dolomite from the same quarry is discussed. Stripping, screening, and washing are included. Seven pages, one figure, seven photographs. ("Rock Products," April 1956, page 86.)

Pressure drops in ducts

For proper sizing of air ducts, one must select the correct pressure drop. An equation and a plot aid materially in design. Three pages, one figure. ("Heating, Piping, and Air Conditioning," April 1956, page 110.)

Jet propulsion

Fundamental types of jet propulsion in current use are covered: ramjet, turbojet, pulsejet, propellerjet, and rocket. Pertinent problems such as fluid flow, flow through orifices,

heat transfer, thermodynamics, ignition, combustion, kinetics, choice of materials, and disposal of exhaust gas are discussed. Six pages, 18 figures. ("Chemical Engineering Progress," April 1956, page 143.)

Predicting flashpoints

A theoretical method for predicting flashpoints of blends of refinery streams and of crude fractions is reported. Five pages, two tables, nine figures, nine references. ("Industrial and Engineering Chemistry," April 1956, page 808.)

Twin furnace boilers

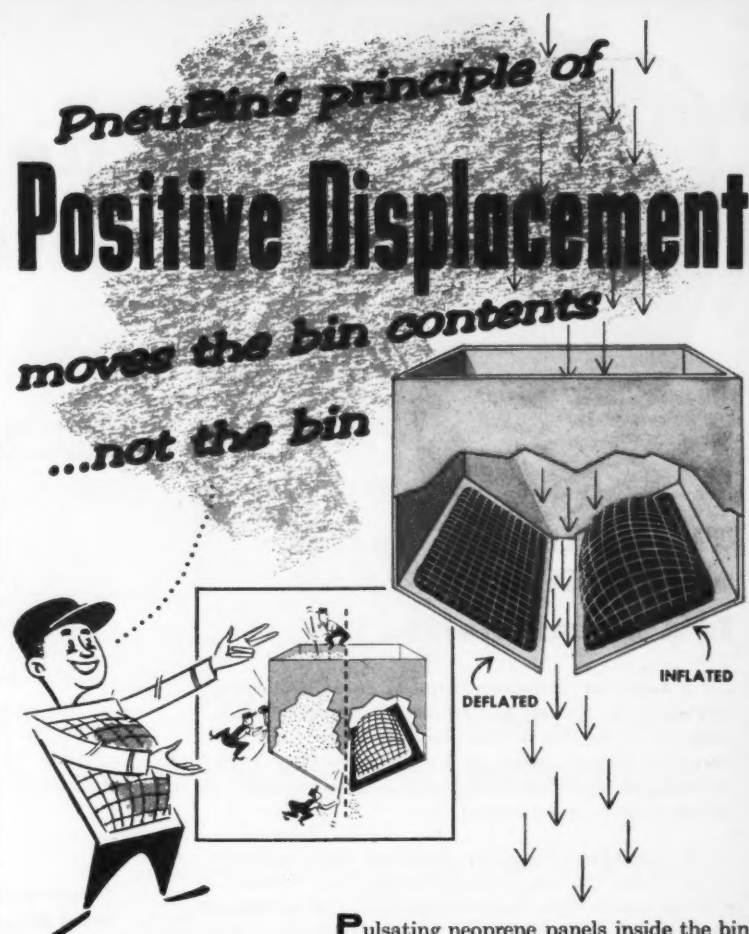
These designs for twin furnace boilers will meet increases in temperature, throttle pressures, and unit sizes through application of tangential firing methods and controlled circulation. Five pages, eight figures. ("Combustion," April 1956, page 42.)

Balance table

This paper describes a table for mounting a microchemical balance. Essential features are reinforced concrete blocks and deflected springs. Four pages, seven figures, 26 references. ("Analytical Chemistry," April 1956, page 517.)

Prehydrolysis pulping

The following aspects of prehydrolysis pulping are covered: pumping, deactivation of lignin, alkaline buffers, use of sodium sulfite, mineral acids, and use of bisulfites. ("Tappi," April 1956, page 193.)



Pulsating neoprene panels inside the bin are PneuBin's secret weapon against bin flow bottlenecks. The PneuBin unit consists of steelbacked, neoprene, pulsating panels mounted on the inside wall of your present bins . . . and air controls to regulate the panels' action. By the pneumatic inflation and deflation of the PneuBin panels, the bin contents are positively displaced to insure free flow. After the panels have deflated, the air control unit (operating off the regular plant air supply) starts another cycle of inflation and deflation. The process continues automatically at whatever frequency is set on the air controller (this frequency is adjustable).

Because the neoprene diaphragm is resistant to oils and most chemicals and is also thick and tough enough to withstand severe abrasive service, PneuBin is applicable to most any bin flow problem.

Sizes: PneuBin panels are available in ten standard sizes from 4" x 12" to 24" x 72". Special sizes can be made if required in quantity.

Send for "Flow Stoppage Report" and free literature. PneuBin engineers will gladly make recommendations, with no obligation on your part.

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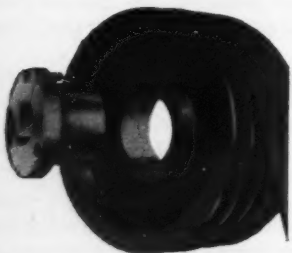


The adjustable-speed wedgbelt drive is a Combination...

... of American Adjustable-Diameter Sheaves, allowing stepless speed variation by internal change of pitch diameter of the sheave. Simultaneous flange movement keeps belt alignment constant. Exclusive *double-taper* hub locks flanges in position, locks sheave tight to shaft... assures positive speed control.

... of American Wedg-Tite Bushings with exclusive *steeper taper* for fast installation and easy removal, uniform compression, positive alignment, and maximum clamping action on the shaft.

... of American Wedgbelts, mold-cured to vary less than $\frac{1}{4}$ of 1% in length, with strict uniformity in taper, thickness and width. Dacron* cords in Super-Service Wedgbelts are $2\frac{1}{2}$ times stronger than rayon, withstand shock loads and high starting torques.



... of American Wedg-Tite Companion Sheaves, precision-matched to the same taper of the bushing, the exact sidewall angle of the belt. Machined to a satin finish, with accurate balance and concentricity, they lower frictional power-loss, increase plant efficiency.

THE RIGHT COMBINATION FOR MAXIMUM
VARIATION OF MACHINE SPEEDS

*Reg. TM. E. I. DuPont de Nemours & Co., Inc.

The American Pulley Company

4222 Wissahickon Avenue
Philadelphia 29, Pa.

When inquiring check 6751 opposite last page

new literature

Properties of acid-proof pipe and fume ducts

Four-page bulletin gives physical properties, chemical resistance, dimensions, and specifications of Permanite pipe and fume ducts. Products are made of a furan resin material reinforced with glass or Dynel fabric and resist acids, alkalis, organic solvents, oil and grease, and water up to 280°F. The Dynel-reinforced pipe also resists hydrofluoric acid.

Bul #1 "Permanite" is issued by Maurice A. Knight Co., Dept. CP, PO Box 111, Akron 9, Ohio. When inquiring specify 6752 on form opposite last page.

Evaporators use waste heat from Diesel engines

Evaporators that transform sea water into fresh water at practically no fuel cost are described in illustrated six-page brochure. Units utilize waste heat from Diesel engines or gas turbines. Capacities range from 300 up to 2100 gph. Literature contains comparison chart showing savings possible as compared to multi-effect evaporators and barged-in water.

"Fresh Water by the Ton" is issued by Special Products Div., Cleaver-Brooks Co., Dept. CP, 326 E. Keefe Ave., Milwaukee 12, Wis. When inquiring specify 6753 on form opposite last page.

ASTM air pollution test methods

Test methods, recommended practice for sampling, and definitions related to air pollution measurements developed by American Society for Testing Materials have been published in pamphlet form. Separate pamphlets available are: 1) Method of Determining Concentration of Odorous Vapors, D 1354-55T; 2) Methods for Continuous Analysis and Automatic Recording of the Sulfur Dioxide Content of the Atmosphere, D 1355-55T; 3) Definitions of Terms Relating to Atmospheric Sampling and Analysis, D-1356-55T; 4) Recom-

Industrial bulletins pertinent to the reader... offering data on products, processes, services

mended Practice for Planning the Sampling of the Atmosphere for Analysis, D 1357-55T.

To obtain any of the above pamphlets remit 30c direct to the American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.

Deals with stainless pipe and fittings

Eight-page technical folder discusses the use of seamless and welded stainless steel pipe and stainless welding fittings in the process industry for applications where corrosion or elevated temperatures are determining factors.

Bul TB-410 is issued by Tubular Products Div., The Babcock & Wilcox Co., Dept. CP, Beaver Falls, Pa. When inquiring specify 6754 on form opposite last page.

Bulletin describes impervious graphite heat exchangers

Compact, impervious graphite heat exchangers are described in illustrated 12-page bulletin. Photographs, charts, and drawings are used to describe various models of cubical and cross-bore units.

Bul 537 is issued by Falls Industries, Inc., Dept. CP, Aurora Rd., Solon, Ohio. When inquiring specify 6755 on form opposite last page.

Data on corrosion resistance of seven materials

A four-page bulletin contains basic corrosion resistance data on seven materials of construction for chemical processing equipment. Resistance of these materials to more than 150 of the most commonly encountered corrosives is given.

Bul A/5 is issued by The Duriron Company, Inc., Dept. CP, Dayton 1, Ohio. When inquiring specify 6756 on form opposite last page.

**On valves for erosive
or corrosive liquids**

Lubricated plug valves which provide quick positive shut-off of erosive or corrosive fluids are described and illustrated in 36-page catalog. Valves are available in steel, semi-steel, and alloy. Sectional drawings, physical data on dimensions, and ratings of each unit are given.

Catalog PV-4 is issued by The William Powell Co., Dept. CP, Cincinnati 22, Ohio. Specify 6757 on form opposite last page.

**Describes fuel oil additive
that emulsifies sludge**

Twenty-page illustrated brochure describes six additives for fuel oil-fired boilers that are designed to emulsify or dissolve sludge in oil and to remove soot from fire side of boiler. Use in coal-fired boilers is discussed.

"Tyfo" is issued by National Research & Chemical Co., Dept. CP, 12520 Cerise Ave., Hawthorne, Calif. When inquiring specify 6758 on form opposite last page.

**Simplified size selection chart
for resin-bonded fans**

Two-page size selection chart in color for resin-bonded fiber glass fans has been found to be of particular interest to those engineers who have seen it. Chart is included in eight page publication on the recently announced fans. Details of the construction of units, photographs, chemical resistance, and other data are included in brochure.

"Resin-Bonded Fiber Glass Fans" is issued by du Verre, Inc., Dept. CP, 374 Delaware Ave., Buffalo 2, N. Y. When inquiring specify 6759 on form opposite last page.

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**chemical
processing**
For Men who
Manage

... because you are responsible for some phase of processing in your company. The Editors explain how you and other "men who manage" these operations are selected to receive the magazine regularly.

... see page 118.

Now — A Revolutionary NEW Steam Trap!

**INSTALL
IT -**

**FORGET
IT!**



SO RUGGED

SO SIMPLE

this steam trap practically eliminates maintenance

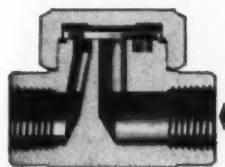
Major advance in trap design!

Imagine a steam trap machined from a solid block of stainless steel. A trap with only 3 parts...cap, disc and body...and not even a valve-closing mechanism—the kinetic energy of steam closes the valve and **ONLY** the TD uses this new operating principle.

That's the revolutionary new Sarco type TD. It has only one moving part... a hardened **SOLID** stainless steel disc. And it is not affected by superheat, water-hammer, corrosive condensate. That's why we can say **INSTALL IT—FORGET IT!**

Use the **SAME** trap for 10-600 psi...for light or heavy loads...without seat or valve change or other adjustments. Closes tight on no load—no steam waste.

Ask for a 60 day trial installation of Sarco TD trap and strainer...write for bulletin 257. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.



SIMPLICITY ITSELF!
No valve-closing mechanisms to wear or stick. No critical clearances to choke. No gaskets to leak. Only moving part a **SOLID** stainless steel disc.

SARCO

Only Sarco Makes All 5 Types

That's why Sarco can give impartial advice on proper steam trap selection.



When inquiring check 6760 opposite last page

IS YOUR PRODUCT IN ONE OF THESE GROUPS?

ALCOHOLIC BEVERAGES
CHEMICALS
DRUGS & TOILET PREPARATIONS
FOOD & BEVERAGES
GASES
OILS, FATS, SOAPS
PETROLEUM PRODUCTS

DO YOU USE A FILTER PRESS?

If the answers are yes, the use of E-D filter paper as a medium can give you exceptional clarity of filtrate at very low cost.

Write for Filter Paper Brochure which lists all the grades most commonly used for industrial filtrations. We will also send you our Filtration Analysis Report to help you determine the best grade for your specific needs. More than 30 regular grades of filter paper, and many special grades are made by us to meet the exacting requirements of industry.



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FILTERTOWN

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When inquiring check 6761 opposite last page

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Whatever your packing need—Allpax has the answer!

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When inquiring check 6762 opposite last page

NEW LITERATURE

On chemically-resistant plastic pipe

Data on PVC plastic pipe, fittings, and valves are given in eight-page bulletin. Pipe described is available in sizes from 1/2 through 8" and can be obtained in still larger sizes if desired. Bulletin gives engineering data on resistance of PVC pipe to more than 200 chemicals.

Bul 80-3 is issued by Joseph T. Ryerson & Son, Inc., Dept. CP, PO Box 8000-A, Chicago 80, Ill. Specify 6763 opp. last page.

Lists equipment's use in waste clarification

Clarification of any liquid containing suspended solids, by coagulation and settling using manufacturer's clarification equipment, is subject of 12-page, two-color brochure. Typical installations are shown both by photograph and line drawings with appropriate operating details given in text. Wastes handled include paper mill, refinery, metal-working, and metal-plating.

Bul 850-B is available from Inflico Inc., Dept. CP, PO Box 5033, Tucson, Ariz. Specify 6764 opposite last page.



Credit the idea for this cartoon to A. A. Schilling in the Research & Development Department of The Remington Arms Co. Inc., Bridgeport, Conn.



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• New, non-caustic detergent, PLANISOL* cleans faster... doesn't burn hands or corrode equipment. Rapidly emulsifies all types of oil. Leaves chemically-clean surfaces. Non-toxic, non-inflammable. Solution can be used over and over.

Applications: Degreasing and cleaning storage tanks, processing equipment, floors. Cleans steel, stainless steels, aluminum, concrete, tile, wood and other materials. Write for complete information and prices.

*Planisol is a trade-mark of Chemical Detergents Company, Inc.

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When inquiring check 6765 opposite last page

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- Less slippage
- Longer life



Try Darcova Puncups in your reciprocating pumps and cylinders, and you too will realize what a big difference they make.

Because they are "engineered" for their job—in precisely controlled textures, shapes and types—and are noted for outlasting other packings at least 3 to 1! Why not get the advantage of this tremendous saving in maintenance and down-time?

Get all the facts

Send today for helpful Bulletin No. 5503.

Puncup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder requirements.



DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.



When inquiring check 6766 opposite last page

CHEMICAL PROCESSING

Complete treatment of n-hexanol given in tech bulletin

Data on physical and physiological properties, specifications, shipping requirements, resin solubilities, and constant boiling mixtures, form a complete picture of n-hexanol in eight-page technical data brochure. Applications in pharmaceutical, textile and leather, detergent, and plastics industries are covered.

Bul F-40035 is issued by Carbide & Carbon Chemicals Co., Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. Specify 6767 on form opposite last page.

Revised radioisotope catalog

Specifications and prices for nearly 100 different radioactive preparations are listed in revised 177-page catalog. Special sections are devoted to descriptions of irradiation facilities, procedure for procurement of isotopes, shipping information, special sources available, service or custom irradiations, neutron-activation analysis, and waste disposal service.

Radioisotope catalog is available on letterhead request to Oak Ridge National Laboratory, Union Carbide Nuclear Co., Radioisotope Sales Dept., Dept. CP, PO Box P, Oak Ridge, Tenn.

Starts chemical magazine

A quarterly magazine that attractively portrays chemicals, applications, and services of manufacturer has recently appeared. First issue has 24 pages and many color and achromatic illustrations.

Columbia-Southern Chemicals is issued by Columbia-Southern Chemical Corp., subsidiary of Pittsburgh Plate Glass Co., Dept. CP, One Gateway Center, Pittsburgh 22, Pa. When inquiring check 6768 on form opposite last page.

For expelling corrosive fumes and gases

One of the features of 18-page publication describing polyvinyl chloride blowers for corrosive applications is the eight pages of data included on the chemical resistance of polyvinyl chloride to a variety of products.

Bul 102 is issued by Industrial Plastic Fabricators, Inc., Dept. CP, Endicott Street, Norwood, Mass. When inquiring specify 6769 on form opposite last page.



TRANSFORMERS...THE CHOICE OF LEADERS IN INDUSTRY

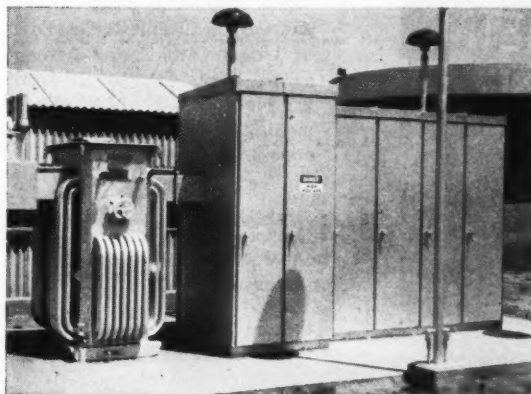
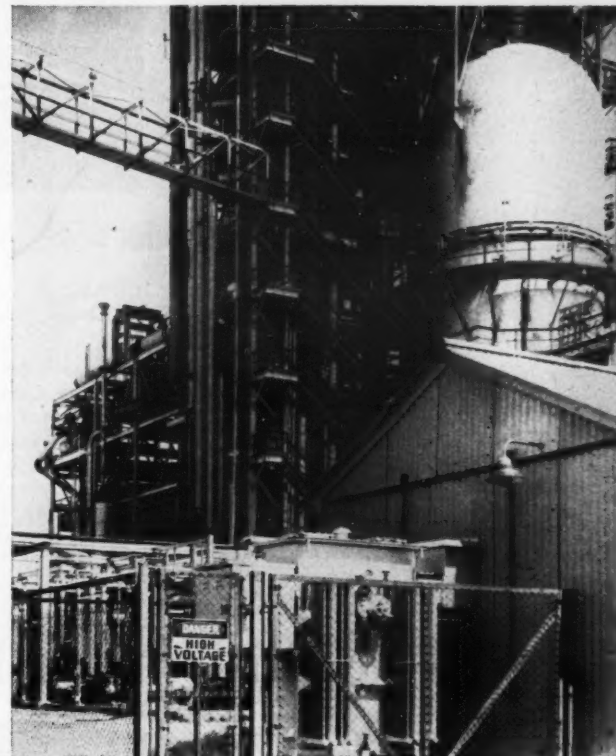
Where uninterrupted power is a must... WAGNER UNIT SUBSTATION TRANSFORMERS

A completely dependable power supply is a vital necessity to an oil refinery. A power interruption of only a few minutes on a "cat cracker," like the one shown at the right, would completely disrupt this important processing operation and cause a shut-down of the entire refinery.

That's why you'll find Wagner Unit Substation Transformers at work at the Carter Oil Company refinery at Billings, Montana.

Wagner transformers are often found in installations where power supply failure would incur great loss because they have a reputation for complete dependability—backed by sixty-five years of transformer building experience.

Wagner Unit Substation Transformers, both liquid-filled and dry-type, are carefully designed to meet distribution requirements. Both liquid-filled and dry-type unit substation transformers are built in ratings through 2000 kva, 15 kv and below—you can choose the type and rating that exactly meets your load-center distribution requirements. Call the nearest of our 32 branch offices, or write us.



The 750 kva, 2400/4160Y to 480 volt, 60 cycle, three-phase, liquid-filled Wagner Unit Substation Transformer feeds the catalytic unit at The Carter Oil Company refinery. At left is shown a 225 kva Wagner substation transformer connected to an outdoor substation at the same refinery. Purchased and installed by The Fluor Corporation, Ltd., Engineers and Constructors for the Petroleum, Chemical and Power Industries, Los Angeles.

Write for Bulletins TU-205 and TU-214. They give full information on Wagner Unit Substation Transformers. Consult the nearest of our 32 branch offices about your next transformer installation.



Wagner Electric Corporation
6359 Plymouth Ave., St. Louis 14, Mo., U.S.A.

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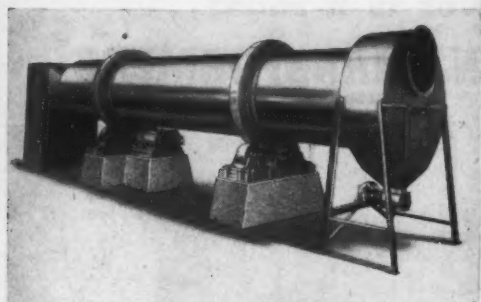
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HOT AIR DRYER 3'6" dia. x 20'0" long



DAVENPORT
PRESSING — DRYING
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ROTARY DRYERS
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Davenport Stainless Steel Rotary Hot Air Dryer drying whey powder in one of the largest Swiss Cheese plants in the United States.

Let our engineers consult with you on your Pressing, Drying, and Cooling problems. Send for complete Catalog C, or for quick reference, consult your *Chemical Engineering Catalog*, 1954 or 1955.

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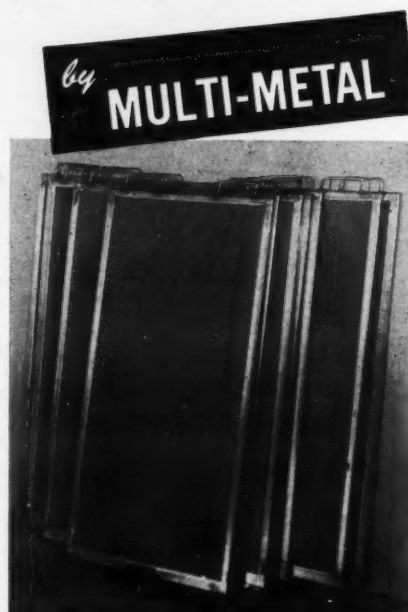
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New "RIM-LOK" Filter Leaf

A Better Leaf
of Simple Design
at Lower Cost

- 1—Provides simple closure of metal filter cloth in leaf frame without use of rivets, bolts or solder.
- 2—Smooth surface of frame facilitates scraping of cake.
- 3—Frame cannot open up or distort even when hammered.
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- 6—Uniform precoating, even on largest leaves.
- 7—Made of any commercial alloy, and with filter cloth of any required mesh.

Send for RIM-LOK bulletin.



MULTI-METAL WIRE CLOTH CO., INC.
1356 GARRISON AVENUE NEW YORK 59, N. Y.

When inquiring check 6772 opposite last page

NEW LITERATURE

Uses of epoxy coating tabulated

Applications of epoxy protective coatings in industry are tabulated in four-page, three-color folder. Outstanding qualities of epoxy coatings are discussed.

Bul on Speed Rex epoxy coating is available from Truscon Laboratories, Div. of Devco & Reynolds Co., Inc., Dept. CP, Caniff & Grand Trunk R.R., Detroit 11, Mich. When inquiring specify 6773 on form opposite last page.

Facts of resin emulsions dealt with in booklet

Uses, advantages, and suggested proportions of chemicals for latex resin emulsions are among topics discussed in 10-page booklet on resin emulsions. Monomers valuable in "tailor-making" resins, emulsifiers, and protective colloids are reviewed in relation to emulsion polymerization. Selected literature references are given.

"Chemicals for Resin Emulsions" is available from Carbide and Carbon Chemicals Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify 6774 on form opposite last page.

Tells of controller for pressure

Printed in two colors, single sheet describes indicating pressure controller for ranges from 0-50 to 0-200 psi. Specifications explain that 10% throttling control is available in this instrument.

Bul 7040 is issued by Industrial Div., Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne & Windrim Ave., Philadelphia 44, Pa. When inquiring specify 6775 on form which is located opposite last page.

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- NO FRAGMENTATION . . . Disc ruptures in several similar lobes. Gives unrestricted opening.
- HIGH SPEED PROTECTION . . . Sure-fire opening makes FDI discs desirable on all systems, hydraulic or gaseous.
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The Engineered "Safety Factor"

Pressure system protection is no problem with frangible discs. You decide your own replacement schedule . . . slide the retainer ring out, replace the disc and re-install. As simple as that.

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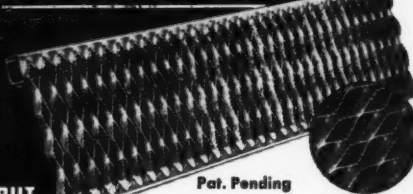


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When inquiring check 6776 opposite last page

FOR MAXIMUM SAFETY

all
over
your
plant
use
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GRIP-STRUT



Pat. Pending

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety grip-strut presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive non-slip footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer — warm in winter

Big Economy Features

- ★ For balconies — no extra light needed below — no extra heat.
- ★ No extra supports necessary — channels are integral part of the material
- ★ No secondary sprinkler heads needed
- ★ Self-cleaning
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost



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NEW CATALOG

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THE GLOBE COMPANY • Manufacturers since 1914
4006 S. PRINCETON AVE. • CHICAGO 9, ILL.

When inquiring check 6777 opposite last page

CHEMICAL PROCESSING

Covers mechanical seals for corrosive service

Complete line of chemically inert mechanical seals for handling acids, solvents, and gases is described in eight-page bulletin. Publication provides construction, service, and application information, including representative installations.

Bul S-205-2 is issued by Crane Packing Company, Dept. CP, 6400 Oakton St., Morton Grove, Ill. When inquiring specify 6778 on form opposite last page.

Present plastisol systems for corrosion control

Two-page data sheet tells how plastisol systems can be used to advantage on duct work and in other applications to control corrosion. Step-by-step procedure for application of the plastisols is given.

Data Sheet #83 is issued by Quelcor, Inc., Dept. CP, Front and Broomall Sts., Chester Pa. When inquiring specify 6779 on form opposite last page.

How boxes aid air shipments

Fully-revised edition of "How to Ship by Air in Corrugated Boxes" points up benefits of air shipment, gives information regarding international shipments, responsibilities for damage, and load limitations. Air shipment terms are fully explained in 24-page booklet which contains data on adaptation of corrugated boxes and other packaging materials for air shipment. Case histories offer typical examples of present use of corrugated packaging for air shipment.

"How to Ship by Air in Corrugated Boxes" is issued by Hinde & Dauch, Dept. CP, Sandusky, Ohio. When inquiring specify 6780 on form opposite last page.

Have you wondered why you receive this magazine, CHEMICAL PROCESSING, without subscription charge?

Or maybe you have wondered why the format of CHEMICAL PROCESSING is so unusual?

Read what the Editors say on page 118.

Technical data on the revolutionary new

holo-flite^{*}

(HOLLOW-FLIGHT)
PROCESSOR

If you have processing operations where slurries, solids, pulps or pastes must be cooled or cooked, be sure to investigate the many unique advantages of the newly-developed HOLO-FLITE Processor before you install any heat-exchange equipment.

Here's the HOLO-FLITE principle...

Two or more screw conveyors rotate slowly in a trough. The blades and shaft of each flight of conveyors are hollow, with provision for circulating the heat-transfer agent through them. The product to be cooled or cooked is moved along the trough, being constantly rotated into, around, over and under the conveyor screws as it moves.

Thus, a continuous thermal transfer takes place between the product and the heat-transfer fluid circulating in the blades. The product is cooled or cooked in continuous-flow without the "stop-and-go" losses of batching operations... and cooled products can be packaged directly from the HOLO-FLITE discharge—saving space, time and additional handling.



THIS 6-TIER HOLO-FLITE cools 7 tons of cottonseed press cake per hour from 285° to 89°F. in a total floor space of only 28 sq. ft.
(Inset) Enlarged cutaway view of HOLO-FLITE screw showing heat-transfer principle.

Here are typical HOLO-FLITE advantages

The HOLO-FLITE principle is so unique it is setting completely new standards of performance in many ways. For example...

*Reg. T.M.

The HOLO-FLITE Saves Space
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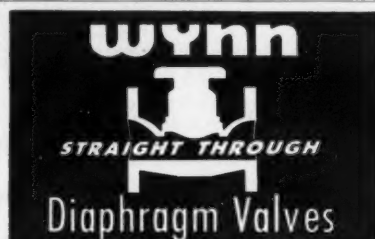
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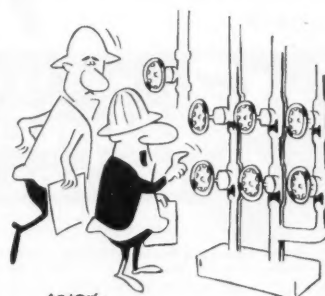
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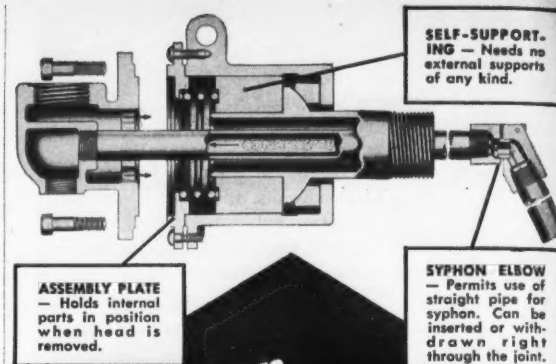
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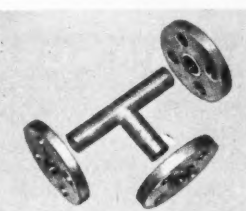
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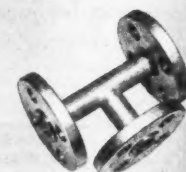


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August 21-24. Western Electronic Show & Convention, Pan Pacific Auditorium, Los Angeles.

September 9-12. American Institute of Chemical Engineers, William Penn Hotel, Pittsburgh.

September 10. Perkin Centennial, American Assn. of Textile Chemists & Colorists, Waldorf-Astoria Hotel, New York.

September 11. American Chemical Society, Minneapolis, Minn.

September 16-21. American Chemical Society, National Meeting, Atlantic City.

September 16-22. American Society for Testing Materials, Pacific Area National Meeting and Apparatus Exhibit, Statler Hotel, Los Angeles.

September 17-21. 11th Annual Instrument-Automation Conference and Exhibit, Instrument Society of America, New Coliseum, New York.

September 23-25. Drug, Cosmetic and Sundry Show, Pharmaceutical Council of Greater New York, Statler Hotel, New York.

September 24-28. Trade Fair of the Atomic Industry, Navy Pier, Chicago.

September 27-29. Drug, Chemical and Allied Trades Section, New York Board of Trade, Annual Outing, Pocono Manor Inn, Pocono Manor, Pa.

October 1-5. American Institute of Electrical Engineers, Fall General Meeting, Morrison Hotel, Chicago.

October 11-12. The Society of the Plastics Industry, Inc., New England Section Conference, Wentworth Hotel, Portsmouth, N. H.

October 15. Salesmen's Association of the American Chemical Industry, Sales Clinic, Commodore Hotel, New York.

October 17-19. Annual Symposium on Antibiotics, Willard Hotel, Washington, D. C.

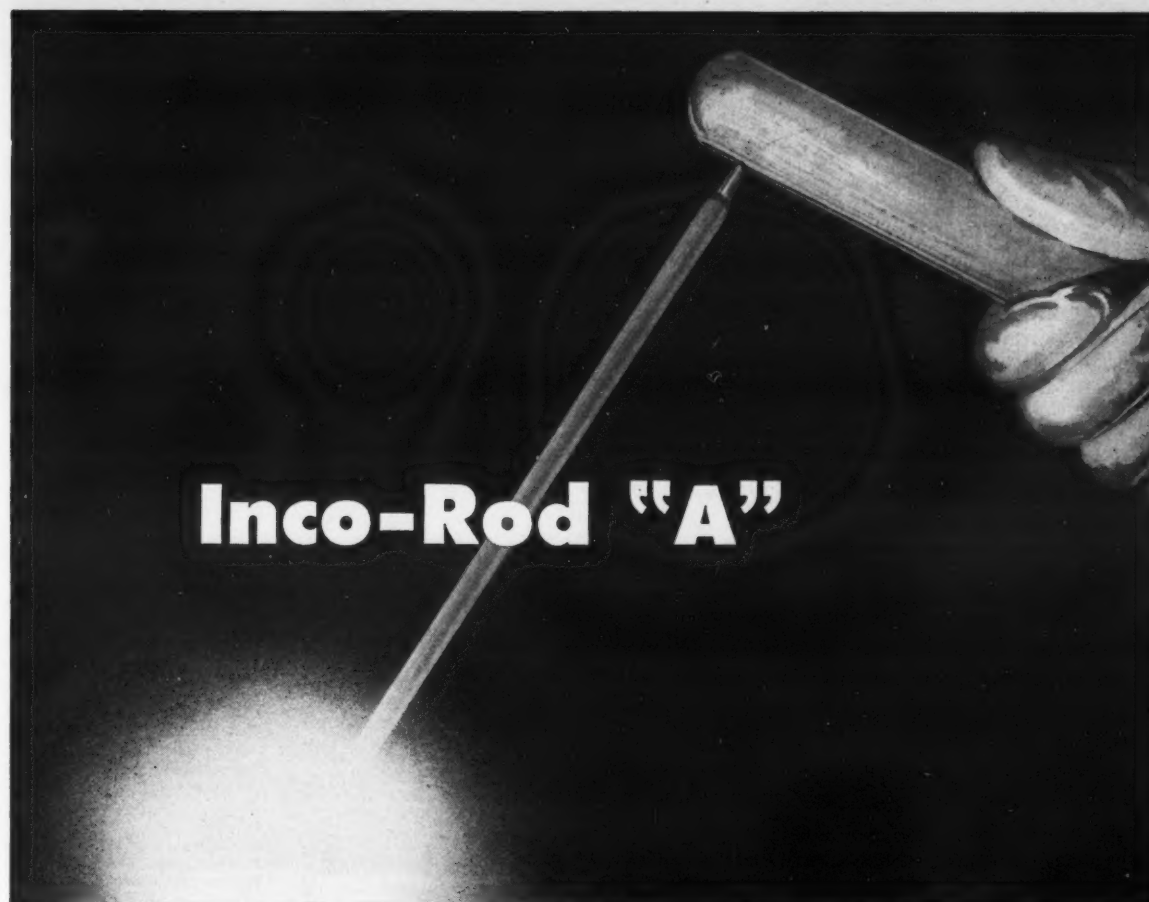
October 21-24. Federation of Paint and Varnish Production Clubs, Annual Meeting, Cincinnati.

October 22-26. 44th National Safety Congress and Exposition, Conrad Hilton Hotel, Chicago.

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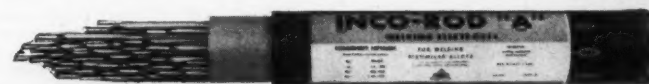
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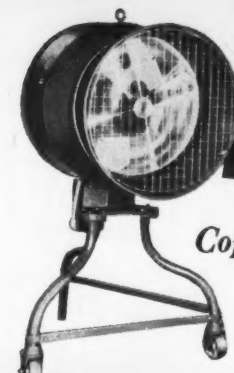
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PROCESSES, EQUIPMENT and MATERIALS



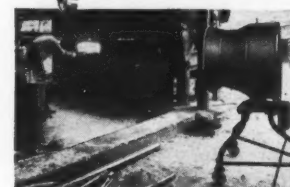
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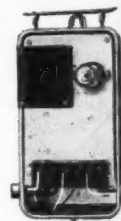
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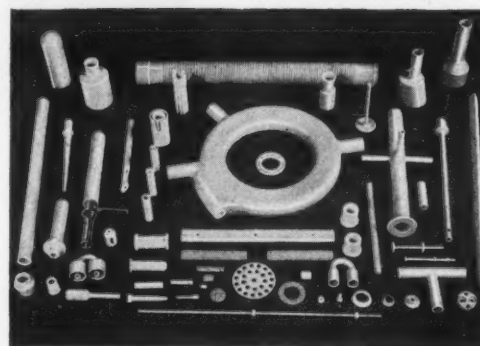
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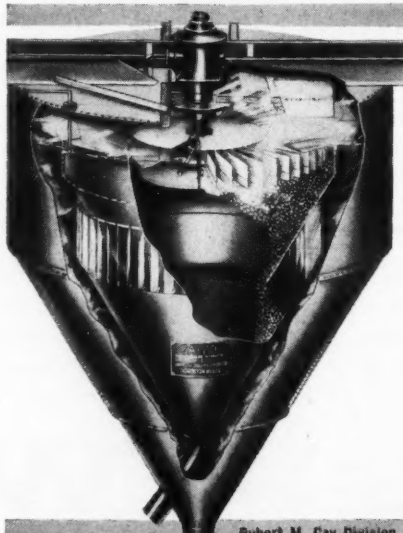


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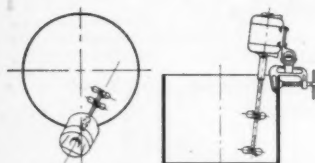
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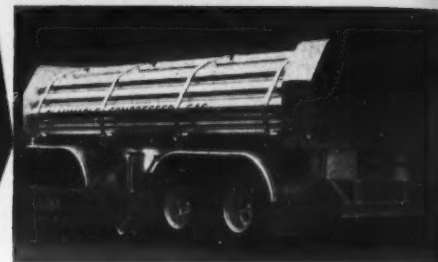
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In addition, NBP provides the framework for a continuing exchange of ideas among member publishers. The result: continuing improvement in publishing practices to make CHEMICAL PROCESSING more useful to its readers . . . more productive for its advertisers.

Chemical Processing

For men who manage the Chemical Processing Industries

Published by Putman Publishing Company

Creators of PUTMAN-STYLE Magazines
... terse, vital editorial; "hand-picked" circulation;
square, high-visibility format; quality readership;
hence more READER ACTION

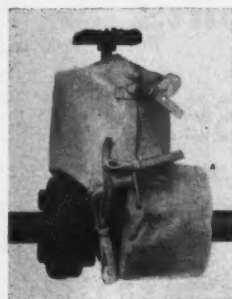


* Courtesy of the publication MEDICAL ECONOMICS, creator of this copy, here adapted to CHEMICAL PROCESSING.



We think of your pipeline leaks
as a joint problem... that
we can solve with MILLSHEFF
"SPRAY-STOP"
VALVE and FLANGE COVERS

Stop accidents — speed maintenance with these rugged, economical, easily-
attached valve and flange covers that protect personnel and
equipment by directing harmful chemical pipeline leaks to the ground.



WRITE FOR LITERATURE
Catalog 55-7-CP showing
our complete line of Valve
and Flange Covers and easy
ordering instructions.

INDICATING "SPRAY-STOP" — Spot pipeline leaks
almost as soon as they start. The rapid COLOR-
CHANGE WARNING of the Indicating "Spray-Stops"
is activated by the smallest leak. VIVID, UNMIS-
TAKABLE COLOR-CHANGE is essential in spotting
valve and flange deficiencies within hours, instead of
weeks, in new plant and after turn-around start-ups.

HIGH-TEMPERATURE Teflon "SPRAY-STOPS" (Non-
Indicating) for application under continuous working
conditions up to a temperature of 500° F.

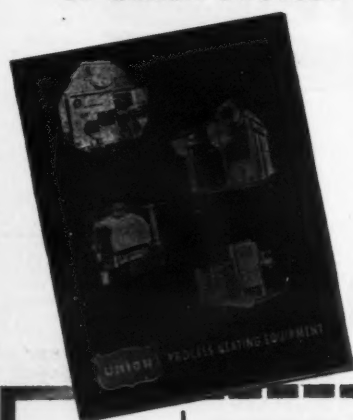
STANDARD NON-INDICATING "SPRAY-STOP" Valve
and Flange Covers also available.

**SPECIAL COVERS MANUFACTURED TO CUSTOMER'S
SPECIFICATIONS.**

NEIRAD INDUSTRIES, Inc.
ONE POST ROAD
DARIEN • CONNECTICUT

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Illustrated Bulletin Presents Newest Designs of Union Process Heating Equipment



Just published, illustrated Bulletin DV
presents the full line of Union Process
Heating Equipment for use in a tre-
mendous variety of applications: high
temperature molding; manufacturing
paint, varnish, etc.; processing food prod-
ucts; plating tin; melting solders, asphalt;
evaporating high boiling materials; petro-
leum refining... plus numerous others.

Designed for use with Dowtherm "A"
and "E", Para-Cymene, Anisole, Aroclor
#1248 and Heat Transfer Oil, Union
Process Heating Equipment assures ac-
curately controlled temperatures over a
broad range at low pressure.

The complete story can be obtained
by mailing the attached coupon to Union
Iron Works, Erie, Pa.

UNION IRON WORKS
1555 Cascade Street, Erie, Pa.

UNION

MAIL your new Process Heating Bul-
letin DV to us, without obligation.

Name Title
Firm
Street
City Zone State

**It's Yours
For The
Asking**

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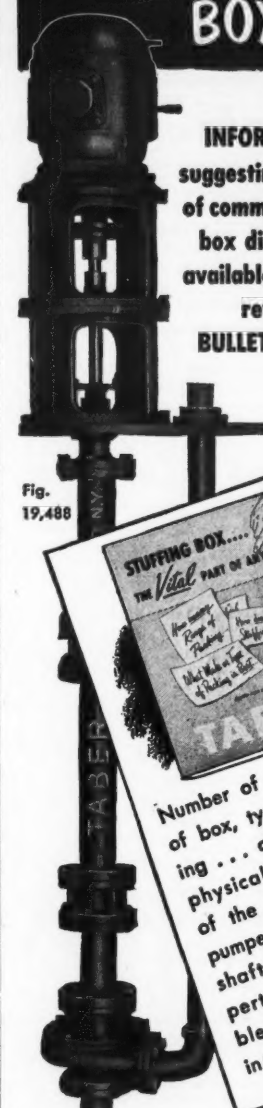


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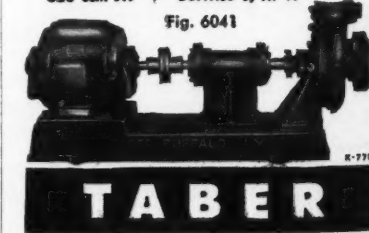
INFORMATION
suggesting solution
of common stuffing
box difficulties;
available in newly
revised
BULLETIN S-147



Number of rings, depth
of box, type of pack-
ing... chemical and
physical properties
of the fluid being
pumped, speed of
shaft and other
pertinent usa-
ble facts are
in this Bulletin.

WRITE on business stationery for your
copy of Bulletin S-147.
TABER PUMP CO. (Est. 1859)
330 ELM ST. + BUFFALO 3, N. Y.

Fig. 6041



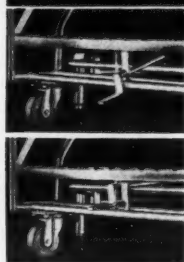
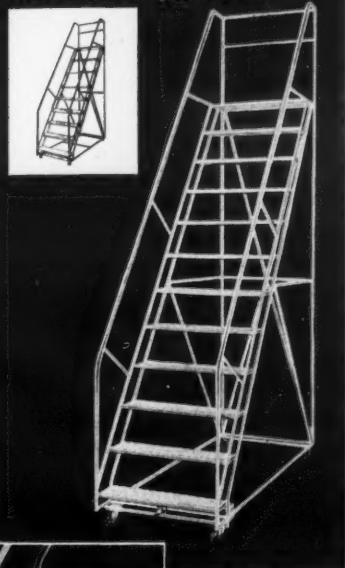
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opposite last page

CHEMICAL PROCESSING

WORK AT HIGH LEVELS SAFELY...

ON BALLYMORE
"Hi-boy" SAFETY-
STEP
LADDERS

FROM 9 TO 12 STEPS



FOOT-OPERATED BALLYLOCK

Step-on brake casters on front of ladder grip floor . . . prevent ladder from rolling, wobbling or "kicking out." When pedal is released, Ballylock quickly retracts by spring action.

Strong, safe, and easily moved about, Ballymore "Hi-boy" Step Ladders provide sure support at extra-high working levels—up to 15 feet!

All-welded steel construction . . . rust-resistant aluminum finish. Smooth-rolling casters provide complete mobility. Rugged step-on Ballylock extends front legs for firm, stable floor contact.

Four sizes, six models to choose from—each with sturdy handrails. Three types of non-slip tread construction.

Write today for complete specifications to Ballymore Company, Wayne 10, Pa.

BALLYMORE LADDERS



When inquiring check 6804
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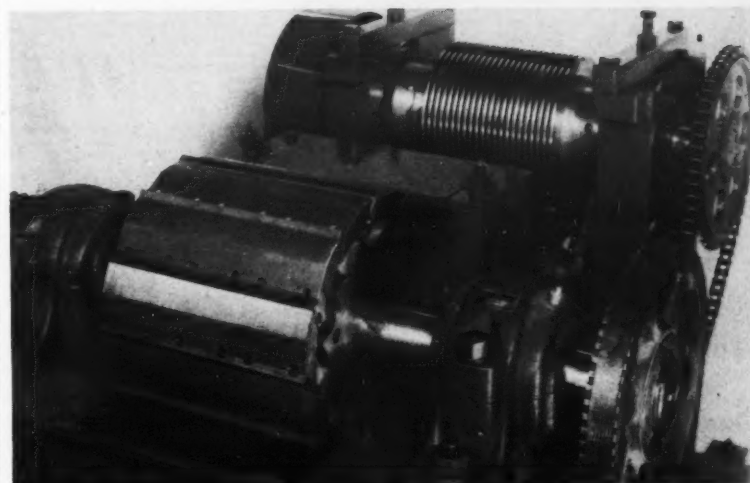
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TAYLOR-STILES Plastic Cutters produce uniform pellets

from
Extruded Strips
or Milled Sheets



There's a Taylor Stiles Cutter for every job of dicing or pelletizing plastics or rubber.

The Little Giant Cutters Series 100 and 200 will take rods or strips and cross cut them into squares or rectangles. For high speeds the 700 Series Cutters, with 12 or 24 fly knives, are recommended.

These same cutters have circular knife assemblies in the place of the regular feed assembly. They take sheet stock and slit it into ribbons then cross cut into squares or rectangles.

Capacities depend on type and width. Cuts are precise without feathers or dust and a minimum of longs. Power consumption is lower and knives stay sharp longer than on other machines.

Write us today for the new four page folders Nos. App. 212 and App. 213. They describe fully the cutters and their operation.



20 Bridge Street
Riegelsville, N. J.

When inquiring check 6805 opposite last page



WHY teflon*

MAY SOLVE YOUR PROBLEM

Check These Properties

CHEMICALLY INERT

Completely unaffected by acids, alkalis and solvents — all chemicals except molten alkali metals and fluorine.

HEAT RESISTANT

Continuous service up to 500° F.

LOW TEMPERATURE TOUGHNESS

As low as -320° F.

NON-ADHESIVE PROPERTIES

The tackiest of materials show little tendency to stick to Teflon.

EROSION RESISTANT

Resists erosion by impinging fluid to a high degree.

LOW CO-EFFICIENT OF FRICTION

Either against itself or other materials.

ZERO MOISTURE ABSORPTION

Absolutely weather resistant.

DIELECTRIC PROPERTIES

At high temperatures and frequencies.

WE CAN OFFER PROMPT DELIVERY ON Sheet

* Tape • Rod • Tube • Special Machined and Molded Parts, Spray Coatings • Mechanical Packings

*DuPont trade-mark for tetrafluoroethylene resin



SEND US YOUR "SPECS" LET US QUOTE!

FLEXROCK COMPANY
3611 Filbert St., Phila. 1, Pa.

☐ We are enclosing sample, specs, and quantity for our TEFLO requirements. Please furnish quotation.

☐ Please send us your TEFLO Bulletin including stock list.

Name

Company

Address

City Zone State

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Less than one part per million impurity

remains during low cost gas purification with

DEOXO purifiers

NO MAINTENANCE

NO OPERATING COST

NO REACTIVATION

CATALYTIC OPERATION

AT HIGH OR LOW PRESSURE:

AT ROOM TEMPERATURE:

Removal of oxygen (up to 3%)
and/or hydrogen (up to 6%)

AT 125° CENTIGRADE:

Conversion of CO to CO₂

AT 250° CENTIGRADE:

Methanation of CO to CH₄

AVAILABLE CAPACITIES:

25 CFH to 500,000 CFH and larger. Special
units designed for specific requirements.

Write for FREE, informative booklet No. 10 and technical assistance.

BAKER
& COMPANY INC. **PRECIOUS**
METALS

113 Astor Street
Newark 5, New Jersey

ENGELHARD INDUSTRIES

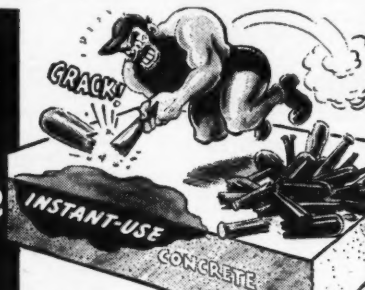
NEW YORK • SAN FRANCISCO • LOS ANGELES • CHICAGO

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This Super Tough Concrete Floor Patch

• SETS INSTANTLY
• WON'T 'STRIKE OUT'

Mail Coupon for Trial Offer



Simply shovel INSTANT-USE into hole or rut — tamp smooth — truck over! No waiting! INSTANT-USE bonds tight to old concrete—right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment. Get FREE BROCHURE and Trial Offer!

INSTANT-USE

FLEXROCK CO. Offices in Principal Cities
3611 Filbert St., Philadelphia 1, Pa.

Please send complete INSTANT-USE information details of TRIAL ORDER PLAN, and Free INSTANT-USE BROCHURE — no obligation. (Clip and attach coupon to Company letterhead).

Name

Title

Company

Address

To get more information on products—use the Reader Service slip opposite this page

When inquiring check 6808 opposite last page

CHEMICAL PROCESSING

Special subscription request-qualification form for use of

JULY 1956

**Management and technical men who wish to receive
CHEMICAL PROCESSING regularly - request below
... if you qualify, there is no charge****

If you are responsible for processing operations, in a management or technical capacity, as corporate officer, manager, technical purchasing agent, chemical engineer, chemist, engineer, or equivalent responsibility ... in a plant of substantial operations* where chemical processing is an important factor ... CHEMICAL PROCESSING will be sent to you regularly, at your request — there is no charge.

Present Reader . . . If this issue of CHEMICAL PROCESSING was addressed to you or if you have previously mailed one of these request slips, it is not necessary to fill in this form.

New Reader . . . If you qualify as outlined above CHEMICAL PROCESSING will be sent to you regularly. There is no charge to those who qualify. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

Please print or type

Name _____ Title _____
Company _____
Main Products _____
Rating of Company _____
Street Address of Company _____
City _____ Zone No. _____ State _____

*"substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage

**See page 118 for Editor's letter telling how and why CHEMICAL PROCESSING is made available to management and technical men

Others in Your Plant . . . If others in your plant, having responsibilities for processing operations as outlined above, would also like to receive CHEMICAL PROCESSING, use the form on back of this sheet.

Change of Address . . . Use this form to notify us of a change in address. Please answer all questions in regard to your new affiliation, and in addition give us your former address including company, city and state.

Please print or type

Former Company Affiliation _____
Former Address _____
Your Name _____ Present Title _____
Present Company _____
Main Products _____
Rating of Company _____
Street Address of Company _____
City _____ Zone No. _____ State _____

**Just mail this request to
READER SERVICE DEPT., CHEMICAL PROCESSING
111 East Delaware Place, Chicago 11, Illinois**

See other side of this sheet



WOULD OTHERS IN YOUR PLANT also like to receive CHEMICAL PROCESSING without charge?

If others in your plant also would like to receive CHEMICAL PROCESSING . . . and if they qualify as outlined on the reverse side of this sheet . . . list their names below. Then mail this slip to READER SERVICE DEPT., CHEMICAL PROCESSING, 111 East Delaware Place, Chicago 11, Illinois.

Please print or type

| | |
|---------------------------|----------------|
| Name | Title |
| Name | Title |
| Name | Title |
| Name | Title |
| Company | |
| Main Products | |
| Rating of Company | |
| Street Address of Company | |
| City | Zone No. State |

IF YOU ALSO WOULD LIKE

to receive CHEMICAL PROCESSING personally
see reverse side of this sheet. There is no charge if you qualify.

See other side of this sheet

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sheet and

V Key

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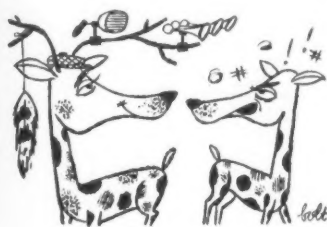
THAT'S INTERESTING

(Continued from page 2)

Tinted ducks and deer

Duck plumage is brighter than ever and the deer have taken on a two-tone look—both the result of projects underway to trace the migration habit of ducks and the movements of deer.

Dye—pink, yellow, and bright green—is being hand applied to ducks along



"I approved the two-tone paint job but this is going too far."

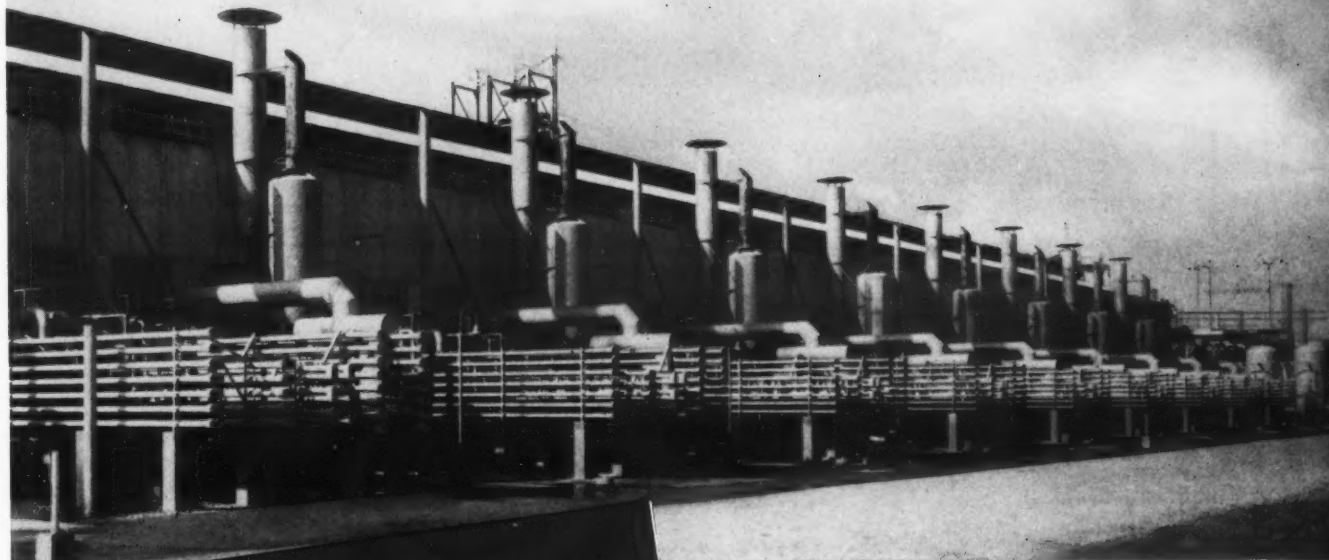
the California-Canada flyways. The deer dye themselves when they step on hidden treadles connected to sprayers. The colorful markings enable spotters to more easily identify the routes taken and time of movement of our furred and feathered friends. (Dyelines and Bylines, American Cyanamid)

A light, is a light, is a light

Incandescent filament, quartz mercury vapor discharge, and fluorescent phosphor light sources have now been combined in a single lamp. It fits into the ordinary electric socket and can be made in every size, shape, wattage, and voltage. Fluomeric lamp yields over 25 lumens per watt and has a rich color. No external ballast or other auxiliary equipment is needed.

Composite light produced is complete in all spectral radiation values and different phosphors can be used to produce a variety of hues. Estimated life of lamp is 12,000 hours. It is produced by Duro-Test Corp., Dept. CP, North Bergen, N.J. . . . or for more information check 6809 on form opposite this page.

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Brown Fintube

The above photo shows a large Houston Petro-Chemical (Synthetic Ammonia) Plant with 9 compressor stations . . . a total of 54 coolers or 306 high pressure heat exchanger sections. Pressures from 72 psi to 5300 psi.

Brown high pressure heat exchanger sections are now performing, with high efficiency, in almost all the Petro-Chemical plants that have been built in the last five years.

BFT high pressure sectional heat exchangers are available for pressures up to 22,000 psi.

High Pressure

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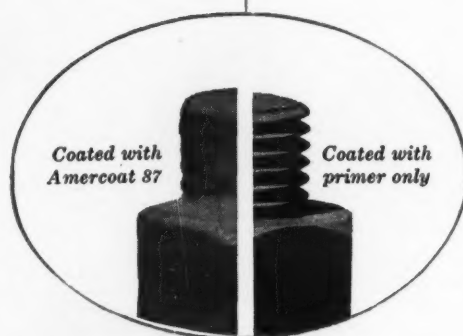
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CUT YOUR MAINTENANCE PAINTING COSTS UP TO 50% *with* AMERCOAT 87 VINYL MASTIC



HERE IS HOW THIS REMARKABLE PROTECTIVE COATING CAN SAVE YOU MONEY:

1. Only one cross spray coat over a primed surface is required for complete protection—this means lower labor costs.
2. Fewer scaffolding and rigging shifts are required.
3. Less down time—dries to touch in minutes, eliminates the risk of contamination between coats.
4. Greater thickness means longer life—lower cost per square foot per year.



Amercoat 87's thixotropic characteristic helps provide extra thickness on sharp edges and irregular surfaces; it is non-porous and will not crack or check.

Amercoat 87 combines the time-tested chemical and weather resistance of vinyl coatings with the thickness of conventional mastics, yet is easily applied with standard industrial spray equipment.

We will be pleased to send you our technical bulletin describing this coating in detail.

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| VENEZUELA | Caracas |
| BELGIUM | Brussels |
| DENMARK | Copenhagen |
| FINLAND | Helsinki |
| NORWAY | Oslo |
| SWEDEN | Stockholm |
| FRANCE | Paris |
| GERMANY | Bonn |
| ITALY | Rome |
| SWITZERLAND | Geneva |
| UNION of SOUTH AFRICA | Johannesburg |